Great Western Highway Upgrade Medlow Bath

Submissions Report

Transport for NSW | June 2022

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Prepared by Mott Macdonald, RPS and Transport for NSW
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Signed:	
Dated:	24 June 2022

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Executive summary

The Proposal

Transport for NSW (Transport) is proposing to upgrade a 1.2 kilometre section of the Great Western Highway at Medlow Bath, between Railway Parade and around 330 metres south of Bellevue Crescent (the Proposal). Key features of the Proposal include:

- upgrade of the existing highway to a four-lane divided carriageway allowing for two lanes of traffic in each direction, either side of a central median with planted trees
- upgrade of the Bellevue Crescent intersection with new turning lanes, U-turn Bay and traffic signals
- a new right turn lane providing access to the Hydro Majestic Hotel
- improvements on Railway Parade to formalise parking provisions, U-turns and rail customer parking
- new indented bus bays on both sides of the highway close to Medlow Bath Station
- construction of a new pedestrian bridge, stairs and lifts to provide an accessible path of travel between the bus bays, the Medlow Bath Station platforms and Railway Parade
- new shared path for pedestrians and cyclists on the western side of the highway
- ancillary works such as the replacement of road surfaces, reconstruction works associated with local roads, driveways, footpaths, kerbs, gutters and retaining walls, drainage works and relocation of services.

The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

Environmental impact assessment

A review of environmental factors (REF) was prepared by Transport to assess the potential environmental impacts of the Proposal in July 2021. This REF was initially placed on public display from Tuesday 27 July 2021 to Tuesday 24 August 2021.

To ensure that community members had more of an opportunity to provide feedback (due to COVID-19 stay at home orders), this was extended to Sunday 5 September 2021. The total consultation was for a period of 41 days.

The main methods used to provide information and notifications for the REF display, include:

- Website and interactive portal which provided background information, maps, Proposal updates and announcements, and information on how to provide feedback.
- Community Updates – printed and distributed
- Poster
- Online consultation sessions
- Stakeholder group meetings
- Business meetings
- Media, social media and advertising
- Direct contact

Submissions report

In accordance with section 5.17 of the EP&A Act, this submissions report has been prepared to provide responses to the issues raised in the submissions received for the Proposal.

Transport received a total of 348 submissions by 250 respondents between Tuesday 27 July 2021 and Sunday 5 September 2021.

Of the 250 respondents (authors), 237 were individuals, nine were community organisations and four were government agencies.

Summary of issues and responses

A summary of the main issues raised by the government agencies, community organisations and community individuals are provided below with Transport responses:

Consultation

- Concern that online consultation was not effective at reaching all members of the community and requesting a delay until in person public displays could be held. Not enough time given to read the REF and submit structured, meaningful comments from relevant stakeholders. Consultation period needs to be extended.

Response:

Formal feedback was invited from all relevant stakeholders and community members. This was widely promoted within the Blue Mountains, the Central West and Western Sydney via social media, newspapers and radio segments.

Given the challenges experienced by some stakeholders in consulting during COVID restrictions, and the volume of material to be reviewed, Transport extended the display period by eleven days. This brought the total number of days on display to 41 days, to allow additional time for the REF to be reviewed, considered and submissions provided.

Alternative options were made available to stakeholders who could not engage online, including printed copies of materials supplied on request and phone consultations.

The volume of submissions and comments received are a testament of a successful engagement with the stakeholders during the display period.

Key aspects of the feedback will be considered in the detailed design and management of the Proposal during construction.

The Consultation Summary Report (refer to Appendix 3) summarises the community engagement activities carried out during the display of the Medlow Bath REF.

Environment – assessment and cumulative impact

- Current REF process for the Proposal is fundamentally flawed because it does not take into account the ‘’significant” cost and cumulative environmental impacts on the greater Blue Mountains area. Requirement for the Medlow Bath village section be halted and a full Eastern Section Environmental Impact Statement (EIS) encompassing Katoomba to Blackheath be conducted.

Response:

The Medlow Bath Upgrade has been prioritised as the first stage to proceed under the Great Western Highway Upgrade Program. The Medlow Bath project has been assessed Great Western Highway to meet the project objectives and could be delivered within its own right.

Transport is meeting its due diligence requirements by undertaking an REF under the EP&A Act 1979 Division 5.1 S5.5, and in its consideration of an activity is examining and taking into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

The Department of Planning, Industry and Environment assesses proposals of state significance infrastructure through the preparation and determination of an EIS. The other assessment process available for projects in NSW is an REF.

The REF assessment process allows Transport not only to investigate the potential environmental impacts of a proposal, but also to confirm whether an REF is the appropriate way to assess each particular proposal.

If investigations conducted in the course of an REF identify a significant impact, the Project can be referred to the Department of Planning to determine through an EIS.

Investigations conducted in the preparation of the Medlow Bath REF did not identify any significant impacts refer to Appendix 8 for further information.

Potential cumulative impacts of concurrent projects in the area are also considered within the assessment as per Clause 228 (1) of the Environment Planning & Assessment Regulation 2000 (EP&A Regulation). Transport would carry out cumulative impacts assessments as the program progresses, as per the DPIE cumulative impact assessment guidelines, in which past, current and relevant future projects would be considered including Medlow Bath.

Proposal justification

- A duplicated highway through Medlow Bath still provides for only one route over the Blue Mountains negating any improvements in travel times especially as a result of accidents. This design will create a bottleneck at Medlow Bath, defeating the whole purpose of the upgrade.

Response

The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

The upgrade of the remaining 34km of two-lane highway to dual carriageway significantly improves the resilience of the highway over the existing conditions and provides suitable capacity for future travel demands. Projected traffic demand for Great Western Highway does not warrant a second route crossing that would impact on the Blue Mountains World Heritage Area.

Regardless of the planned duplication of other areas of the Great Western Highway, the upgrade at Medlow Bath would provide additional road space including extra lanes and shoulders that can be used to manage incidents, greatly improving resilience of this section of the highway. This work would also enable greater connectivity to the town for local residents, highway travellers and Medlow Bath visitors.

The Transport Access Program (TAP) is an initiative with aims to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport initiatives. To date more than 100 stations across NSW have undergone upgrades as part of this program with another approximately 38 either currently undergoing or planned to undergo upgrades in the near future. The Great Western Highway team has collaborated with the Transport Access Program team in developing the proposal, including lessons learned from other similar projects.

Design

- Consideration of design alternatives, particularly focusing on lane width, safety, landscaping, Bellevue Crescent intersection, proposed pedestrian bridge, tunnel, bus shelter, lighting and parking.

Response:

Design standards

The design meets all applicable road design standards. The proposed lane widths maximise efficiency within the Proposal corridor to minimise impacts to adjacent properties and enable the incorporation of additional shared paths. These lane widths allow for the safe movement of heavy vehicles along the highway as well as around corners at the maintained speed limit of 60km/hr.

It should be noted that Austroads guidelines (2009) provide a framework that promotes efficiency in design and construction, economy, consistency and safety for road users. The design team have carefully, diligently designed the Medlow Bath upgrade in line with the full suite of today's national, state and local design guidelines. Subsequent design and safety reviews have verified its compliance. The list of design standards applied were articulated in Section 3 of the Medlow Bath Review of Environmental Factors.

Development of design

Throughout the development of the design, landscape architects (Spackman Mossop Michaels) worked closely with the engineers, architects and environmental advisors, as documented in Section 6.9 of the REF. The Urban Design, Landscape Character and Visual Impact Assessment Report followed a robust and well-considered approach to design. This also includes liaising with urban designers from Transport and Blue Mountains City Council. The outcomes have identified opportunities for the design of the proposed works, in particular for the pedestrian bridge as well as integrated landscaping.

Bellevue Crescent

The option assessment exercise for the Bellevue Crescent design has confirmed that the preferred concept design (incorporating the U-turn facility) remains the best option to provide access for all users when compared to the alternative Bellevue Crescent design. The alternate Bellevue Crescent design will not proceed.

Pedestrian bridge

Further information has been provided expanding on the options considered to improve pedestrian access across the Highway and connecting to the Medlow Bath Station. This includes further details on the factors that influenced the option selection, development and architectural refinement of the pedestrian bridge design.

Following our ongoing engagement with Heritage NSW and Blue Mountains City Council, the bridge design and station precinct is continuing to progress through a series of design challenge workshops to improve its fit with the surrounding heritage context.

Heritage and architectural specialists will be working with key stakeholders to develop the heritage experience between Medlow Bath Station and the Hydro Majestic in a manner that draws in local context and character. This will be required as part of the Works Application under Section 60 of the *Heritage Act 1977*.

Further community information sessions will be held as the design matures, to engage the community on progress made.

Bus stop

Following feedback regarding potential safety concerns of school children at the bus stop on the Great Western Highway should the bus stop on Railway Parade be removed, Transport have modified the design of Railway Parade to keep a bus stop in this location. The heritage bus shelter currently located on the east-bound side of the Great Western Highway would be relocated to Railway Parade for these users.

Lighting design

The upgrade of roadway lighting on the Great Western Highway is adopting Category V5 the lowest possible lighting levels, suited to rural village locations. Lighting would be designed and implemented with LED lighting to orientate lighting directly where it is needed, to minimise light spill and glare impacts on nearby residents and businesses. A lower colour temperature light fitting is also proposed to reduce the impact that high intensity white light can create in areas like Medlow Bath.

The lights on the station and pedestrian bridge would incorporate an innovative motion-controlled lighting reduction strategy, where some lit areas would be motion activated or the brightness reduced during off peak periods.

Parking

Whilst the removal of approximately 40 highway parking spaces on the Great Western Highway reflects a permanent impact, parking for Hydro Majestic was already assessed and expanded by the addition of the southern car park through a prior Development Application as the highway parking spaces would be needed for future highway widening.

The proportion of current public parking spaces on the highway in this area that are being used by rail commuters, are being relocated to Railway Parade as part of the upgrade. Parking on Railway Parade would be formalised and expanded to include 21 parking bays and one accessible parking space between Medlow Park and the Railway Station.

Landscape character and visual amenity

- Removal of large mature trees option would represent a significant visual intrusion into the landscape setting.

Response:

Several trees along the Great Western Highway would be removed as part of the works. The arborist report identified that a majority of these mature large trees (including Radiata pines) were nearing their end of life and therefore have an elevated risk of falling branches. Removal of these large Radiata Pine trees which, due to their condition, are prone to falling during heavy storms, would improve safety for road users and residents.

The trees that are removed would be replaced with new plantings that have been designed by landscape architects (Spackman Mossop Michaels) with careful consideration given to the role they would play in offsetting the loss of mature trees along the length. This would include additional vegetation on either side and within the central median of the Highway, as well as along Railway Parade and around the station.

Noise and vibration impact

- Before commencing works, noise and vibration must be identified and addressed, particularly for residents most exposed, such as Railway Parade and Bellevue Crescent.

Response:

Noise and Vibration assessment has been undertaken as part of the project environmental impact assessment and was included within the REF. Specific noise assessments and identification of abatement opportunities would be written into delivery contractor requirements or begun by the project team prior to construction beginning. This work would be conducted by negotiation with affected property owners and informed by professional acoustic engineers, to determine suitable and effective noise abatement measures specific to each property.

Traffic and transport

- Medlow Bath will remain a major traffic bottle neck for at least two years. Concerns traffic signals would not be synced properly, causing traffic congestion. Signage is needed for No Right Turns and U-Turns.

Response:

Modelling and traffic volume studies show that Great Western Highway traffic will continue to grow into the future in line with increased traffic demand and growth, experience in with or without the highway upgrade. The Medlow Bath traffic and transport assessment identified the future volumes, vehicle type growth and operational performance of the highway with and without the Medlow Bath Upgrade Proposal. This assessment projected improved performance with four lanes.

The provision of traffic signals at Bellevue Crescent can greatly improve local access to and from the highway with a safe intersection arrangement. The timing of the signals at Bellevue Crescent can be coordinated with the Station Street / Railway Parade signals within the Transport SCATS system which is managed by the Transport Management Centre and is designed to optimise traffic flow.

Socio-economic impact

- The proposal will not contribute anything to the development of tourism or add anything positive to the local residential amenity.

Response:

The socio-economic assessment identified a short-term impact on tourism which can be best mitigated during construction by partnering with local accommodation facilities to provide worker accommodation which would help to offset mid-week impacts on tourism.

Long term improvements to amenity and placemaking would see increased accessibility for residents, local traffic, tourists and transport users. Improved accessibility across the township with the addition of the new bridge and shared paths would provide safe connection and amenity for all users.

These improved active transport links and transport facilities would help to increase the number of people visiting Medlow Bath by both road and rail modes of transport.

Water quality and hydrology

- The REF must include all environmentally sensitive areas likely to be affected by the project, particularly water catchment areas. Increased paved surfaces could alter groundwater recharge rates, impacts to residences and fragile ecosystems such as ecologically endangered Blue Mountains Swamps.

Response:

The design of the water quality basins, treatment devices and bio filtration has progressed since the REF was prepared in July 2021. This Submissions Report provides additional information on the detailed design of the water retention basin, proposed next to Medlow Park.

The basin would incorporate water quality treatment measures aimed at achieving beneficial effect (NorBE) requirements established by water quality targets as outlined below:

- Gross Pollutant Trap, using a site specific designed Baramy Single Vane GPT, or approved equivalent. This system is provided to manage gross solid pollutants as well as spill management for liquid pollutants like petroleum and oil spills.
- Bioretention and ground infiltration systems have been incorporated within the onsite detention basin to improve ground penetration of stormwater, improving downstream water quality.
- Downstream water quality treatments would contain run off generated during major storm events and release it them at safer flow rates once the storm has passed, ensuring that runoff generated by the project would not negatively impact water quality or volumes downstream.

Heritage - Non-Aboriginal

- The bus shelter is an important tourist and community feature in the village. It must be preserved and replicated with a different mural when moved to the other side of the road.
- The extent and severity of impact to key heritage items (Majestic Hotel, Medlow Bath Railway Station and Avenue of Trees) is sufficient to warrant comprehensive assessment under an EIS. This should

assess the cultural, aesthetic and historical values of the village of Medlow Bath as identified in the 2015 LEP.

Response:

The REF included the Statement of Heritage Impact (SoHI) which was prepared in accordance with the relevant heritage guidelines, and the level of impact assessed is in accordance with the Material Threshold Policy (Heritage NSW, 2020). This SoHI followed industry best practice in terms of detailed assessment and provided a definition of potential impact of the Proposal on the item's significance.

Impacts to heritage items identified by the SoHI were mainly associated with the installation of the new pedestrian bridge. RPS provided heritage design advice during the detailed design of the pedestrian bridge and station through specialised workshops described by the bridge options report (appendix 5).

The design of the highway avoids work within the heritage curtilage of the Hydro Majestic. The SoHI identified that the proposal may have a minor to moderate physical impact and a moderate to major visual impact on the Hydro Majestic. The SoHI recommended measures to mitigate these impacts which include:

- Heritage awareness training for all contractors and project personnel so they become aware of the sensitive nature of the heritage items and have an understanding of unexpected finds procedures
- Protection of significant heritage fabric (including Hydro Majestic and its stone fence) which will include minimum operating distances of machinery, installation of protective barriers and vibration monitoring.
- Archival photographic recording of the heritage items within Medlow Bath
- Heritage interpretation plan covering not just Medlow Bath but the whole Great Western Highway upgrade.

These have been included within the Construction Environmental Management Plan.

In regard to the locally listed Avenue of Trees, many of the original Radiata Pines are no longer along the corridor. An independent arborist assessment has also identified that a majority of the replacement Western Red Cedars were also found to be suffering a degenerative disease. The Medlow Bath Upgrade landscape design aims to generate a new median tree feature that will respond to the intent of the original Avenue of Trees. This presents a long-term outcome that reinterprets the Avenue of Trees.

Heritage – Aboriginal

- There has not been an extensive investigation of potential Aboriginal artefacts on either side of the Great Western Highway. The REF has been completely inadequate in identifying the potential wealth of Aboriginal heritage likely to be demolished between Mount Victoria and Hartley without an EIS.

Response:

Transport has comprehensively investigated the corridor for items of Aboriginal cultural heritage or significance, and as documented in the REF, there are no known Aboriginal sites identified within the proposal area.

The Mount Victoria to Hartley Valley section of the highway upgrade is outside the scope of the Medlow Bath Upgrade and will be considered through an environmental assessment of that section of the proposed highway upgrade.

The proposal area at Medlow Bath has undergone extensive landscape modification and high level of disturbance from previous transport and other development. This has been documented as part of previous Aboriginal heritage investigations (Jacobs, 2020).

In the event of Aboriginal artefacts being uncovered during construction, the Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime Services, 2015) would be followed.

Biodiversity

- The Proposal is located in a buffer zone of the Greater Blue Mountains World Heritage Area property, protected under the EPBC and so, impacts of both construction and the road use itself needs to be assessed in accordance the EPBC Act.

Response:

The footprint of the Proposal and its buffer lies outside the World Heritage area with the Blue Mountains National Park, which is located more than 300 metres away. No nationally listed threatened species, endangered ecological communities or migratory species were identified in the biodiversity assessment of the footprint of the project.

As such, a referral under the Environmental Protection and Biodiversity Conservation Act (EPBC Act) is not required.

Impacts beyond the Medlow Bath Upgrade study area are assessed by other environmental assessments specific to those sections of highway upgrade, such as the Great Western Highway Upgrade - Katoomba to Blackheath (East Section) refer to Appendix 8 for further information.

Air quality

- Increased traffic from a dual highway, resulting in increased noise, and impacts to air quality. Shared pedestrian/cycle path near the highway means users will be exposed to high levels of exhaust fumes.

Response:

Modelling and traffic volume studies show that Great Western Highway traffic will continue to grow into the future in line with increased traffic demand and growth, with or without the highway upgrade.

Catering for both observed and projected vehicle growth over time, traffic modelling has identified that duplication of the highway would allow traffic to flow more efficiently. This would mean less stop-start traffic, generating a modelled improvement in air quality.

The Proposal area would be restored with improved landscaping. This would provide acoustic screens and improve the local air quality, in comparison to the existing conditions experienced along the corridor length which has experienced the continuing removal of mature trees due to storm damage.

Property acquisition

- Disagreement with the Proposal including ‘alternative option’ to the Bellevue Crescent U-turn and roundabout, allowing for the acquisition of Hydro and Residential land. Preference for no acquisitions of homes of full-time residents, if possible.

Response:

The option assessment exercise for the Bellevue Crescent design has confirmed that the preferred concept design (incorporating the U-turn facility) remains the best option to provide access for all users when compared to the alternative Bellevue Crescent design. The alternate Bellevue Crescent design including any potential impact of that option on private property will not proceed.

The details for property acquisition would be determined during the detailed design and any property acquisition would be undertaken in accordance with the provisions of the NSW Property Acquisition (Just Terms Compensation) Act 1991.

Construction

- No mention of compensation in the event of significant impacts on residences close to highway during construction phase, e.g. Railway Parade or Bellevue Crescent.

Response:

Construction activities would be guided by a Construction Environmental Management Plan (CEMP) to ensure work is carried out to Transport specifications within the Proposal area. forms of

This CEMP would include management of noise and vibration impacts. This would include the assessment of noisy activities that may impact nearby residents. If the noise levels are deemed as being unreasonable works procedures can e adjusted or various forms of respite offered.

In addition, noise impacts would be further mitigated by a community planting initiative which is being progressed on Railway Parade. Residents and local landscaping professionals are working with Transport to provide plantings to help screen these residents from construction. Additional environmental assessment

Additional environmental assessments and reports have been completed to assist with the design of the duplication project since the REF was finalised for display (July 2021). These assessments are:

- Arborist assessment.
- Updated Visual Impact Assessment.
- Preferred Design Report - Bellevue Crescent Intersection Options.
- Pedestrian Bridge Option Report
- Updated Water Quality Assessment

Revised environmental management measures

The REF identified a range of environmental management measures proposed to avoid or reduce environmental impacts. After consideration of the issues raised in the submissions during consultation on the REF, Transport has provided additions and revisions to the environmental management measures for the Proposal where appropriate. These are provided within Section 5.

Next steps

Transport for NSW, as the determining authority, will consider the information in the REF and this submissions report and make a decision on whether to proceed with the Proposal. These documents will form part of the formal determination of the Project and its Conditions of Approval.

Transport will inform the community and stakeholders of this decision and, where a decision is made to proceed, will continue to consult with the community and stakeholders prior to and during the construction phase.

Contents

Figures

Tables

Appendices

1. Introduction and background

1.1 The Proposal

The Great Western Highway Upgrade - Medlow Bath project (referred to herein as the Proposal) consists of upgrading a 1.2 kilometre section of the Great Western Highway (Great Western Highway) at Medlow Bath, between Railway Parade and around 330 metres south of Bellevue Crescent.

The Proposal as part of the Great Western Highway Upgrade Program (GWHUP) will help to reduce congestion, deliver safer, more efficient and reliable journeys for those travelling in, around and through the Blue Mountains, and better connect communities in the Central West.

Over the last decade, the NSW Government has progressively upgraded sections of the Great Western Highway to make it safer and more reliable for all road users. The Upgrade Program will complete and realise the potential of decades of work in upgrading the Great Western Highway across the Blue Mountains, completing the final 34 kilometre link in a modern dual carriageway roadway. The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including *NSW Future Transport Strategy 2056 (Transport, 2018)* and the *NSW Freight and Ports Plan (Transport, 2018).* The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

Key features of the Proposal include:

- Upgrade of the existing highway to a four-lane divided carriageway allowing for two lanes of traffic in each direction, either side of a central median with planted trees.
- Upgrade of the Bellevue Crescent intersection with new turning lanes, U-turn Bay and traffic signals.
- A new right turn lane providing access to the Hydro Majestic Hotel.
- Improvements on Railway Parade to formalise parking provisions, U-turns and rail customer parking.
- New indented bus bays on both sides of the highway close to Medlow Bath Station.
- Construction of a new pedestrian bridge, stairs and lifts to provide an accessible path of travel between the bus bays, the Medlow Bath Station platforms and Railway Parade.
- New shared path for pedestrians and cyclists on the western side of the highway.
- Ancillary works such as the replacement of road surfaces, reconstruction works associated with local roads, driveways, footpaths, kerbs, gutters and retaining walls, drainage works and relocation of services.

The Proposal is located about 90 kilometres west of the Sydney Central Business District in the Blue Mountains local government area (LGA). The Great Western Highway at Medlow Bath follows a narrow and difficult alignment constrained by the Blue Mountains National Park, steep topography, a railway line and the existing village, for which the highway acts as the main street.

Construction of the Proposal is anticipated to take around 24 months to complete, weather permitting. This timeframe includes the construction works to the road and station as well as installation of the pedestrian bridge.

A more detailed description of the Great Western Highway Upgrade - Medlow Bath can be found in the Review of Environmental Factors (REF) prepared by Transport for NSW in July 2021.

The Proposal location and regional context are shown in Figure 1.1.

Key features of the Proposal are shown in Figure 1.2.

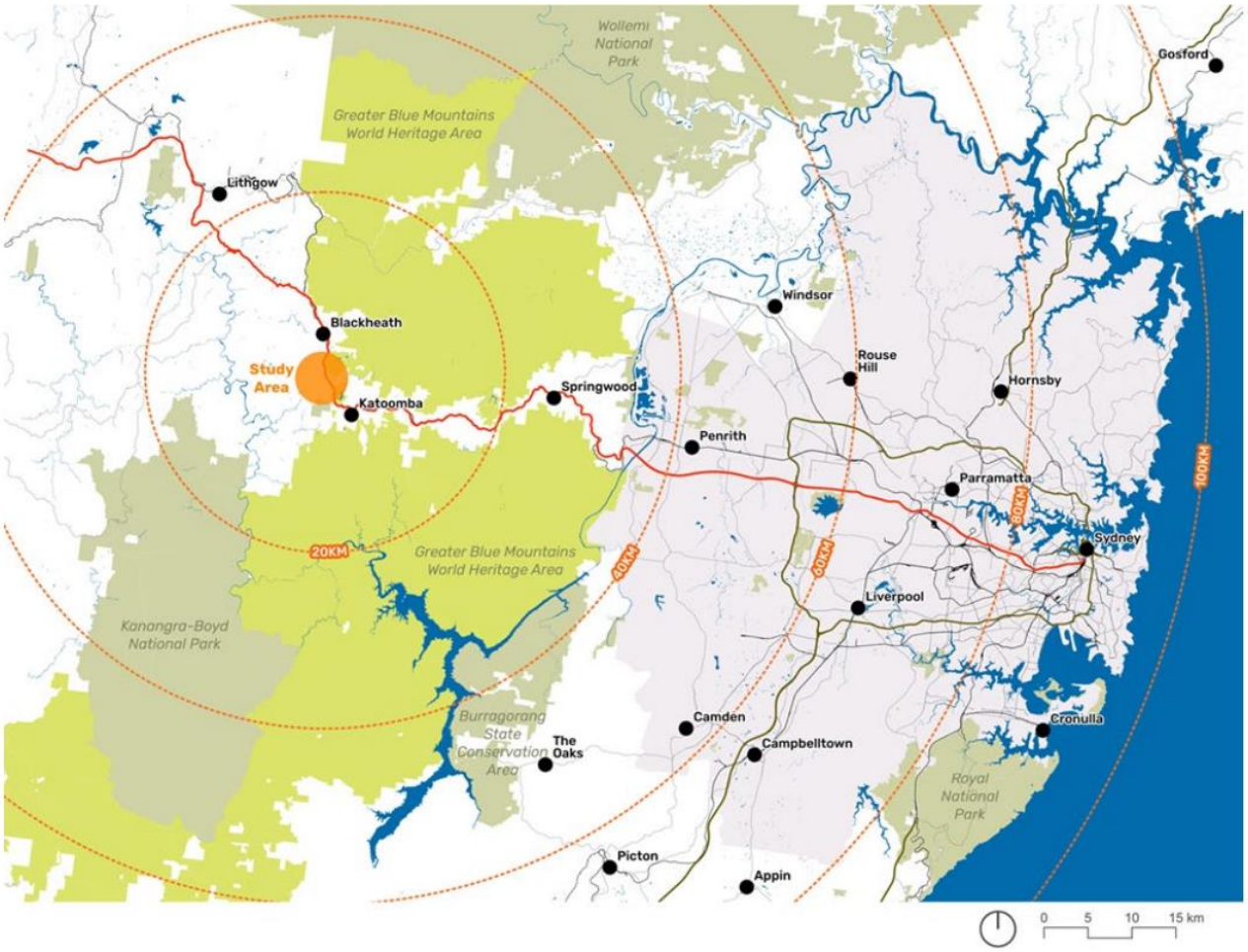


Figure 1.1: Regional context of the Project

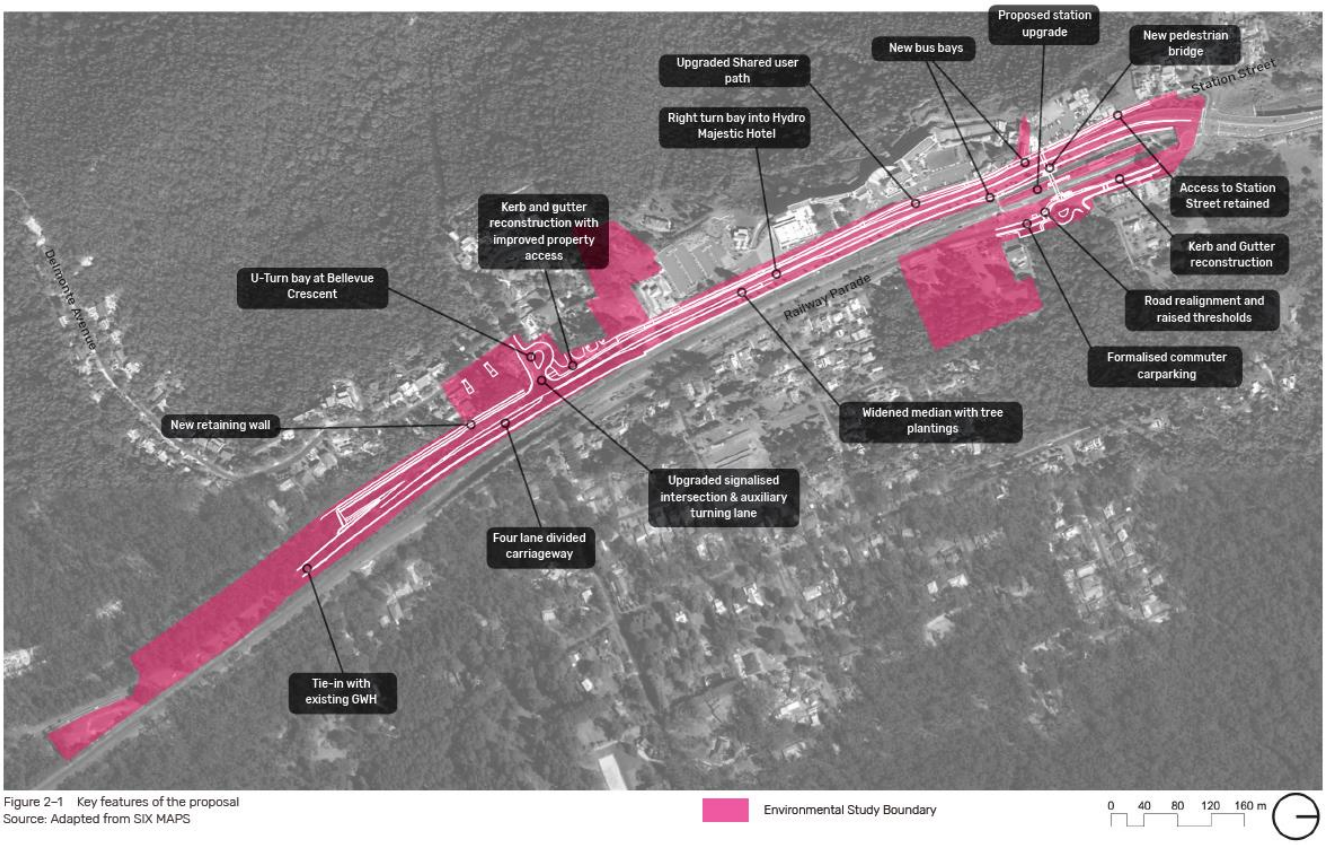


Figure 2-1 Key features of the proposal
Source: Adapted from SIX MAPS

Figure 1.2: Key features of the Project (Spackman Mossop Michaels, 2021)

1.2 REF display

Transport prepared an REF to assess the potential environmental impacts of the Proposal in July 2021. This REF was initially placed on public display from Tuesday 27 July 2021 to Tuesday 24 August 2021.

To ensure that community members had more of an opportunity to provide feedback, this consultation and exhibition period was extended until Sunday 5 September 2021.

The total consultation period was for a period of 41 days.

The following methods were used to provide information and notifications for the REF display:

Website and interactive portal

- The Transport for NSW website, nswroads.work/gwhdconsult was used to provide information about consultation, including the REF documents, fact sheets, the online interactive map, online bookings and a feedback form.

Community Update

- A six-page community update was developed and delivered to Medlow Bath residents. It included a map of the Medlow Bath Concept Design
- A secondary community update including a reply-paid submission form which could be handwritten and posted to the project team, was printed and distributed to Medlow Bath residents in early August.

Static display

- A static display was set up in the Katoomba Shopping Centre which encouraged people to take information home to read.

Poster

- A poster promoting the REF display, information session and instructions on how to make a submission appeared in social media ads, in the static display and on the online portal.

Consultation Sessions

- These sessions were held on the following dates:
    - Wednesday 28 July 1.00–2.30pm
    - Saturday 31 July 12.30–2.00pm
    - Tuesday 3 August 6.30–8.00pm
    - Thursday 5 August 6.30–8.00pm
    - Friday 13 August 12:30-2:00pm
    - Tuesday 17 August 6:30-8:00pm

Stakeholder group meetings

- The following stakeholder group meetings were held:
    - Medlow Bath Highway Action Group, 27 July, 2, 12 and 16 August 2021
    - Medlow Bath Residents' Association, 27 July, 2, 16 and 18 August 2021
    - Medlow Bath Rural Fire Service, 18 August 2021
    - Blue Mountains Cycling Safety Forum (11 and 25 August 2021)

Business Meetings

- The project team met with the following businesses located on the Great Western Highway:
    - The Hydro Majestic Hotel (12 and 23 August 2021)
    - The Chalet (20 August 2021)
    - CDC Buses (16 August 2021)
    - Lithgow Busline (19 August 2021)
    - United Service Station property owner (9 September 2021)

Media and advertising

- Advertisements were placed in the following platforms to notify of the REF display:
    - Several newspapers (additional advertisements were placed to announce the extension of the consultation period)
    - Local radio stations were also used
    - NSW Roads Facebook page

Phone contact

The Program's email and phone number was publicised for the community to contact the project team directly with queries or concerns, to request a phone consultation and to make formal written REF submissions.

Face-to-face consultation

Due COVID-19 restrictions during the consultation period, and the lack of certainty as to when restrictions would be eased, Transport was unable to offer face-to-face consultation. Consultation sessions were made available online or via the phone.

Online consultation sessions carried out during the public display period provided the community a chance to learn more about the project, ask questions and 'have their say'.

Community involvement activities included:

- Media release
- Project webpage
- Interactive portal
- Community update through letterbox drops
- Advertising in local newspapers
- Social media advertisements
- Online information sessions through Microsoft Teams
- Phone consultations

1.3 Purpose of the report

In accordance with section 5.17 of the EP&A Act, this submissions report has been prepared to provide responses to the issues raised in the submissions received for the Proposal.

This submissions report relates to the REF prepared for The Great Western Highway Upgrade - Medlow Bath and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the Proposal and the REF were received by Transport. This submissions report summarises the issues raised (**Chapter 2**) and provides responses to each issue (**Chapter 3**). The report also details investigations carried out since the finalisation

of the REF and identifies additional environmental assessment (**Chapter 4**), changes to the Proposal (**Chapter 5**), and new or revised environmental management measures (**Chapter 6**).

Note: No changes to the design are proposed that would require the preparation of a preferred infrastructure report and only minor revisions have been made to the safeguards and management measures as described in the REF.

2. Submissions received

2.1 Respondents

Transport received a total of 348 submissions by 250 respondents between Tuesday 27 July 2021 and Sunday 5 September 2021. All written submissions postmarked prior to 5 September were also included. Table 1-1 and Appendix 1 lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in Chapter 2 of this report.

Of the 250 respondents (authors), 237 were individuals, nine were community organisations and four were government agencies.

Given the high volume of submissions received by individual respondents (237), allocated author numbers for individual respondents can be found in Appendix 1.

Table 2-1: List of respondents

Respondent	Author No.	Estimated number of issues (topics) received in submission
Government agencies		
WaterNSW	242	22
Blue Mountains City Council	21	12
NSW Rural Fire Service	177	4
Sydney Water	193	1
Community organisations		
Blue Mountains Association of Cultural Heritage Organisations Inc.	20	5
Greater Blue Mountains Area World Heritage Advisory Committee	27	2
Medlow Bath Residents Association	56	9
Blue Mountains Historical Society Inc.	72	4
Blackheath Area Community Alliance	167	2
Motorcycle Council of NSW	172	1
Mountains Rhododendron Society of NSW Inc.	173	2
Rod Stowe (National Trust)	202	8
Medlow Bath Action Group (MAG)	221	24
Individuals		
Total of 237	Refer to Appendix 1	Refer to Appendix 1

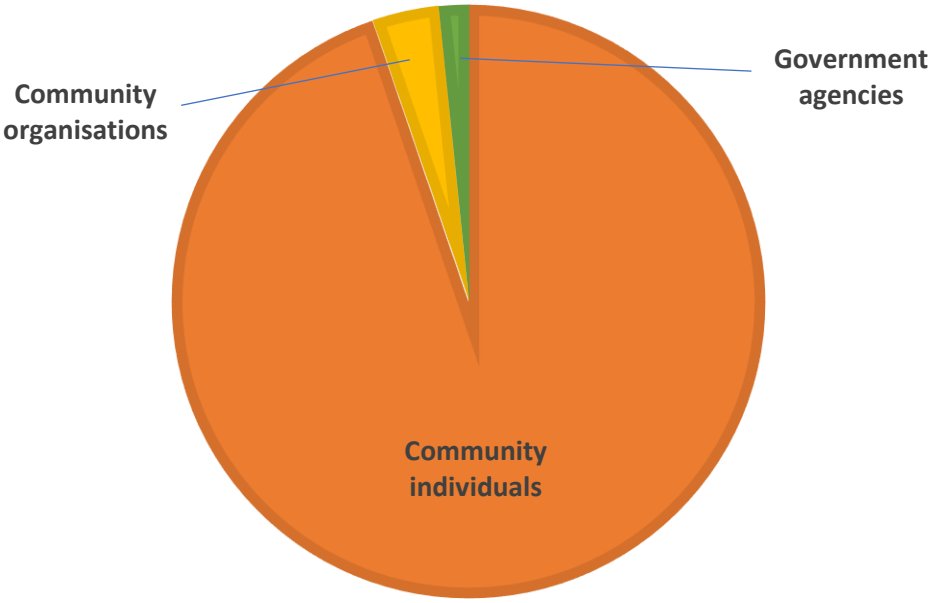


Figure 2-1: Respondent categories

2.2 Overview of the submissions received

Transport received a total of 348 submissions. Each submission has been examined individually in order to understand the issues raised. Issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided.

2.2.1 Individuals and community organisations

Chapter 3 documents the submissions received from individuals and community organisations and responses from Transport.

In summary, the issues raised by individuals and community organisations generally relate to the following topics:

- Consultation
- Environmental – EIS and Cumulative Impact
- Proposal justification
- Design – Safety
- Design – Urban Design and Landscaping
- Design - Bellevue Crescent intersection (including alternate option)
- Design - Pedestrian bridge
- Design - Bus shelter
- Design - Lighting
- Design – Parking
- Landscape character and visual amenity
- Noise and vibration impact
- Traffic and transport
- Socio-economic impact
- Water quality and hydrology
- Heritage – Aboriginal
- Heritage – non-Aboriginal
- Biodiversity

- Air quality
- Property acquisition
- Construction
- Operation
- Out of scope

2.2.2 Government agencies

Chapter 4 documents the submissions received from government agencies and responses from Transport.

Whilst these submissions also include some of the broader topics covered above (Section 2.2), in summary, the issues raised by each individual government agency generally relate to the following topics:

WaterNSW

The Proposal is located within the Sydney Drinking Water Catchment (SDWC) and is therefore subject to the requirements of the SDWC State Environmental Planning Policy 2011, requiring public authorities to consider whether the activity would have a neutral or beneficial effect (NorBE) on water quality. In addition, a number of issues in relation to surface water quality and hydrology have been raised.

Blue Mountains City Council

Blue Mountains City Council's submission is based on the following topics:

- REF, concept designs and discussions with Transport.
- Potential impacts on the built heritage and environment of Medlow Bath.
- Community consultation matters that need addressing.
- Need for the project.

NSW Rural Fire Service

The NSW Rural Fire Service submission is based on the following topics:

- Access to the Fire Station during site preparation and construction.
- Water management (drainage and hydrology) during construction.
- Request for 24hr contact for construction site supervisor(s).

Sydney Water

Sydney Water's submission is based on the following topics:

- Collaborative work on water and wastewater servicing final design between Sydney Water and Transport.
- Sydney Water asset protection and potential relocation.
- Notification on potential contamination near Sydney Water assets.
- Specialist Engineering Assessment (SEA).
- Adjustment designs should consider the time to connect to the live system to minimise impact on customers.
- Waste licence requirements.

2.3 Support for the Project

Upon review of the submissions received, there is general support that improvements to the Great Western Highway at Medlow Bath is required, but that the nuances of the design need to be refined.

The following are some examples of support for the project:

- “Concept design looks great. Great work. Please get on and build it ASAP.” (Unique Author 7)
- “Absolutely support this whole project idea! And well done to TFNSW and all involved in this project so far…. This upgrade in general is long overdue and will make a huge improvement to liveability, accessibility and longevity of Medlow Bath. The sooner we can get this project started the better!” (Unique Author 68)
- “Just get it done, now” (Unique Author 78
- “The Medlow Bath upgrade advertised is in keeping with the character requirements of the Blue Mountains whilst making the arterial corridor significantly safer. The community has been waiting for this upgrade for over 30 years. It is critical this upgrade is supported and not obstructed by lobbyists, action groups or political agenda, as has happened significantly in the past and currently.” (Unique Author 161)
- “Love your design and plans. This will make it so much safer. The see-through lift idea is brilliant. I do NOT want a tunnel. I am in total support of widening the existing highway.” (Unique Author 175)

3. Response to submissions

3.1 Summary

An overview of the issues raised by all categories combined is provided in Table 3-1. This chapter addresses each submission category and associated response provided by Transport.

In addition, Table 3-1 indicates the relevant section number where issues raised by each respondent are addressed within this report to allow easy navigation. Referencing of where responses are for each individual author are provided in Appendix 1.

Table 3-1: Submissions and comments raised by all respondents

Respondent	Author No.	Category of issue raised	Section number where issues are addressed
Government agencies			
WaterNSW	242	• General support • Proposal design • Consultation • Surface water quality, drainage and hydrology • Cumulative impact	4.1
Blue Mountains City Council	21	• Environment – EIS and cumulative impact • Design – options for a tunnel • Design – pedestrian bridge • Consultation • Non-Aboriginal heritage • Transport and traffic • Environmental quality (urban design, landscape character, locality and visual impact) • Surface water quality and hydrology • Biodiversity • Safety of the environment • Cumulative impact	4.2
NSW Rural Fire Service	177	• General support • Access (construction) • Hydrology and drainage	4.3
Sydney Water	193	• Utilities • Consultation	4.4
Community organisations			
Blue Mountains Association of Cultural Heritage Organisations Inc.	20	• Consultation • Environment - EIS • Design – Station and pedestrian bridge • Proposal justification	5.1 5.2 5.7 5.3

Greater Blue Mountains Area World Heritage Advisory Committee	27	• Environment – EIS and Cumulative Impact	5.2
Medlow Bath Residents Association	56	• Proposal justification	5.3
Blue Mountains Historical Society Inc.	72	• Heritage – Non- Aboriginal • Design - Pedestrian bridge • Project justification • Environment - Cumulative impact	5.16 5.7 5.2 5.3
Blackheath Area Community Alliance	167	• Project justification • Design - General	5.3 5.4 - 5.10
Motorcycle Council of NSW	172	• Environment – EIS and Cumulative Impact • Project justification • Design – Pedestrian Bridge	5.2 5.3 5.7
National Trust	202	• Consultation • Heritage – Non-Aboriginal • Design - Pedestrian bridge • Environment – EIS and Cumulative impact	5.1 5.16 5.7 5.2
Medlow Bath Action Group (MAG)	221	• Consultation • Design – Safety • Design – Urban Design and Landscaping • Design – Bellevue Crescent intersection (including alternate option • Design – Safety • Design – Pedestrian bridge • Noise impact • Traffic • Socio-economic impact • Water quality and hydrology • Heritage – non-Aboriginal	5.1 5.4 5.5 5.6 5.4 5.7 5.12 5.13 5.14 5.15 5.16
Individuals			
Refer to Appendix 1 for reference for issue to author		• Consultation • Environmental – EIS and Cumulative Impact • Proposal justification • Design – Safety • Design – Urban Design and Landscaping • Design - Bellevue Crescent intersection (including alternate option) • Design - Pedestrian bridge • Design - Bus shelter • Design - Lighting • Design – Parking • Landscape character and visual amenity • Noise and vibration impact	5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 5.10 5.11

	• Traffic and transport • Socio-economic impact • Water quality and hydrology • Heritage – Aboriginal • Heritage – non-Aboriginal • Biodiversity • Air quality • Property acquisition • Construction • Operation • Out of scope	5.12 5.13 5.14 5.15 5.16 5.17 5.18 5.19 5.20 5.21 5.22 5.23

4. Responses to submissions from government agencies

Transport received a total of four government agency submissions in response to the REF consultation.

Where submissions received from separate community groups/individuals cover the same topic, responses to those submissions are combined.

4.1 WaterNSW

4.1.1 General support

Issue description

In summary, WaterNSW raised the following issues:

- The Proposal is located within the Sydney Drinking Water Catchment (SDWC) and is therefore subject to the requirements of the SDWC State Environmental Planning Policy 2011, requiring public authorities to consider whether the activity would have a neutral or beneficial effect (NorBE) on water quality.
- WaterNSW supports the implementation of mitigation and operational management and maintenance measures that will lead to a beneficial effect on water quality outcomes.
- It is critical that Transport continue to consult closely with WaterNSW throughout the design and construction of the Proposal.
- WaterNSW requests the opportunity to review and provide comment on the CEMP.

Response

Transport acknowledges the support by WaterNSW for the Proposal and is committed to continued collaboration with SDWC during the detailed design and construction phases of the project.

The REF included mitigation measures to minimise adverse environmental impacts from the development and will form part of the Conditions of Approval. These are detailed in Section 7 of the REF and include the writing of a Construction Environmental Management Plan (CEMP) and sub plans.

The CEMP would be prepared in consultation with government agencies, including WaterNSW, based on the Conditions of Approval for the project. The sub plans will also include a surface water management plan (SWMP). This is being drafted based on the detailed design and the planned construction methodology. It includes practices and procedures to control surface water runoff during construction.

4.1.2 Proposal design

Issue description

In summary, WaterNSW raised the following issues:

- Potential for increased rainfall and flooding intensity due to climate change should also be considered during detailed design
- WaterNSW assumes the existing drainage structure performance will be increased to a minimum capacity of 1 per cent annual exceedance probability.
- Transport to provide information on the design criteria for blockage of cross drainage structures
- Future upgrade impacts should be explicitly considered in the mitigation options developed.

Response

Upgrade of the water catchment Great Western Highway has been considered as part of this Proposal which includes drainage from the road, bridge and station surfaces into a new water basin for treatment prior to discharge.

No work associated with other sections of the Great Western Highway upgrade drain into the proposed works at Medlow Bath. However, there is a small portion of the southern catchment that is discharged away from the Medlow Bath treatment and will be captured and treated as part of the adjoining Great Western Highway upgrade works.

The drainage design would allow for the potential increase in rainfall intensity and storm duration in line with Transport's climate change sensitivity allowances. The water quality basin next to Medlow Park has been designed with a capacity to detain a one per cent annual exceedance probability storm. A blockage factor of 50 per cent is allowed at the inlet point to the rail crossing at the sag point in the road alignment. Additional information on the design of the water quality catchment is provided in Appendix 7.

4.1.3 Consultation

Issue description

In summary, WaterNSW raised the following issues:

- A comprehensive SWMP to be developed and implemented in consultation with WaterNSW.
- Considering the potential impact on water quality flowing to the SDWC and Special Area, WaterNSW requests the opportunity to review and provide comment on the CEMP.
- The detailed design must be developed in close consultation with WaterNSW.

Response

Transport would continue to consult with WaterNSW during the detailed design phase of the project to develop best practice outcomes for water quality during construction, operation and future maintenance of the highway. Further consultation and engagement with WaterNSW will occur during the preparation of the project CEMP and relevant management sub plans. A draft of the SWMP will be provided to WaterNSW for review prior to the works commencing.

4.1.4 Surface water quality, drainage and hydrology

Issue description

In summary, WaterNSW raised the following issues:

- Southern tie in bio-filtration basins and grassed swales are also subject to the SDWC SEPP requirements and the detailed stormwater drainage plan should address catchments and treatment.
- WaterNSW support the implementation of measures that result in a beneficial effect on water quality for all runoff, noting that quantity of runoff must also be considered to achieve it.
- Runoff from the Proposal would flow into the Blackheath Special Area and such downstream impacts should be considered as part of the project design and operation.
- Redirection of waters into Adams Creek thereby increasing water quantity and possible changes to water quality.
- Without appropriate management measures, the Proposal is likely to cause changes to affect the volume and peak runoff rates into waterways from the upstream catchments. Mitigation of peak flow discharge from basins to be no greater than under the existing conditions.
- Surface water and groundwater potential impacts includes spills and release of harmful chemicals and appropriate safeguards are required.

Response:

It is noted that the southern catchment drains to a future basin to be constructed as part of the Great Western Highway East package works. Interim measures will be adopted to manage and control runoff in this location.

The current design has been modelled to demonstrate it will produce a Beneficial Effect on water quality for all runoff, as per the NorBE assessment in Appendix C of the REF.

The measures recommended in the REF are being adopted for the detailed design. Transport notes that design development has been undertaken through regular workshops with Transport, Blue Mountains City Council and WaterNSW and this will continue in the future.

Spill management is being considered and documented as part of the detailed design. – refer to Appendix 7 for additional information on the management of water quality.

Water runoff will be captured and treated through onsite detention to manage flow rates during rain larger events. The design of this detention ensures all water captured will be treated through a series of water quality treatment measures prior to discharge.

Transport is ensuring the works are not worsening impacts in downstream catchments and maintaining the current downstream conditions at the discharge point from the works. Transport will also provide Blue Mountains City Council with funding to complete additional secondary downstream treatment works between Medlow Park and Portland Road.

4.1.5 Cumulative impact

Issue description

In summary, WaterNSW raised the following issues:

- ESD not fully covered in mitigation options.
- Maintaining existing peak flow rates for run-off and groundwater does not take into account future development in terms of sustainability
- Consideration of ways to future-proof mitigation options against the cumulative impacts described in REF.

Response:

Future developments would be required to meet the same targets and guidelines Transport are meeting in accordance with Blue Mountains City Council requirements (Section 4.2). The principles for ecological sustainable development (ESD) are being applied in the detail design to assure sustainability principals underpin our detail design and construction efforts.

The southern catchment is an example of runoff being captured and treated by adjoining sections to assure cumulative impacts are treated with physical measures at each location. Separate environmental impact assessments are being prepared for the other projects for the Great Western Highway Upgrade Program which will include consideration of cumulative impacts generated from this project to adjoining sections refer to Appendix 8 for further information.

4.2 Blue Mountains City Council

Blue Mountains City Council provided a submission during the display of the REF. Key issues from their submission are summarised as follows - refer to Appendix 2 for Blue Mountains City Council's full submission.

Responses to each of the key issues raised by Blue Mountains City Council are also provided.

4.2.1 Environment – EIS and Cumulative Impact

Issue description

In summary, Blue Mountains City Council raised the following issues:

- Blue Mountains City Council commitments (9.3 & 9.4) recorded in the Council's 2020 Blue Mountains Local Strategic Planning Statement are relevant to this submission and to the works proposed by Transport between Katoomba and Blackheath. For details, refer to Appendix 2 - BM Local Strategic Planning Statement – Living Sustainably 2040.
- Blue Mountains City Council submits that Transport is bound by s5.7(1) of the EPA Act to prepare an EIS for the Great Western Highway upgrade works between Katoomba and Blackheath to address significant and identified environmental impacts arising at a regional level.
- The REF fails to account for the cumulative impacts of the upgrade within the Katoomba to Blackheath Great Western Highway corridor.
- The REF does not adequately consider the significant adverse impacts of noise, amenity, and place quality likely to result with the implementation of the single option proposed.
- The REF fails to appropriately identify the activity and, in the case of Medlow Bath works, the REF fails to consider the cumulative environmental impacts of the upgrade works in association with the proposed upgrades between Katoomba and Blackheath.
- Clause 228(2)(o) (EP&A Regulation) requires Transport to consider the cumulative impacts of a proposed activity, with other likely or future activities, when determining whether an EIS for the activity is required.
- Transport has not assessed cumulative impacts and the omission of that assessment constitutes a non-compliance with the requirements of clause 228. That omission, in itself, points to the inadequacy of the REF as a mechanism for determining the likely impacts of the proposed works on the environment.

Response:

Transport has undertaken a Review of Environmental Factors (REF) under the EP&A Act 1979 Division 5.1 and examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

The statutory planning pathway for the Great Western Highway upgrade at Medlow Bath was established in accordance with the Environmental Planning and Assessment Act 1979 and the Infrastructure SEPP (ISEPP) 2007. Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the Proposal is for a road upgrade and duplication and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the Environmental Planning and Assessment Act 1979.

It was found that it was unlikely to cause a significant impact on the environment and therefore it was not necessary for an EIS to be prepared and for approval to be sought from the Minister under Division 5.2 of the EP&A Act.

Additionally, the project was not likely to have an impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Government Department of Agriculture, Water and Environment was not required.

The Medlow Bath project is only one part of the overall Great Western Highway Upgrade Program of works. Further upgrades have been proposed based upon available funding, project location, construction type and staging.

Further upgrades including both the Katoomba to Blackheath (East) and Little Hartley to Lithgow (West) projects will also be subject to assessment in accordance with the *Environmental Planning and Assessment Act 1979*, with the appropriate statutory planning pathway selected as per each project's potential significance of impacts.

Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPIE) has been used as a guide. Refer to Appendix 8 which identifies future projects and assesses likelihood of future and cumulative impacts.

Cumulative impacts include past, current and relevant future projects where that information has been exhibited or is available to the public, within a selected study area and time period. Transport will carry out cumulative impacts assessments as each project within the program progresses. Specifically:

- Heritage: there are no impacts on the same heritage item across separate projects within the Great Western Highway Upgrade Program.
- Biodiversity: there is very limited impact to PCT's and specific species from the Medlow Bath REF which would therefore not increase tests of significance beyond current assessments.

All submissions received as part of the exhibition of the Medlow Bath REF will contribute to the finalisation and determination of the REF.

4.2.2 Design – Options for a Tunnel

Issue description

In summary, Blue Mountains City Council raised the following issues:

- Blue Mountains City Council does not support the four and five lane surface corridor proposal and the material impacts on the form and function of Medlow Bath village.
- The Proposal of four and five lane regional highway redefines and transforms the village, with highly consequential impacts.
- In place of co-design and exploration of options, the community is provided with only one option.
- Given the state and national objective for an enhanced link to regional NSW, and the geographic constraints of Medlow Bath, there are only two strategic solutions – surface corridor and a tunnel.
- The extended tunnel option has been considered by Transport but not evaluated and communicated to the community as part of the public REF process.
- In contrast with Mt Victoria and Blackheath where a tunnel is proposed based on a co-design process which examined four (4) options, three of which are bypasses, and which is also supported by an EIS.
- For a tunnel option, an assessment should include the ongoing use of the existing highway as a local and tourist road and public domain improvements including planting, on-street parking, relationship to heritage items and as an alternative link road.
- An important factor to consider when assessing the need for alternative access, the likelihood of accidents and natural disasters resulting in the blockage of the highway and the subsequent management of highway and local traffic.

Response:

The historical development of the Great Western Highway between Katoomba and Blackheath has long focussed on surface widening. This is reflected in the Local Environmental Plan (LEP) reservations and corridor planning regimes dating back to the 1950's. Corridor reservation assumptions remained relatively unchanged since the construction of the bridge over rail at the intersection of Station Street and Railway Parade at Medlow Bath in 2002.

The Great Western Highway Upgrade Program proposes to deliver 34 kilometres of four lane divided highway between Katoomba and Lithgow. The NSW Government has committed $2.5 billion in funding towards the planning and construction of the duplication.

In November 2019, the strategic corridor for the proposed upgrade between Katoomba and Lithgow was put to the community for feedback. This included the previously reserved corridor from Mount Victoria to Lithgow and included the corridor between Katoomba and Mount Victoria. At this time the NSW Government also committed to examining the feasibility of providing tunnels under Blackheath and Mount Victoria.

The Australian Government has committed more than $2 billion in funding towards the East and West sections of the Great Western Highway Upgrade, between Katoomba and Blackheath, and between Little Hartley and Lithgow, respectively. The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

The NSW Future Transport Strategy 2056 (Transport 2018) makes specific reference to *"A focus on east-west connectivity is now essential to create a truly connected transport network, with initiatives for investigation including…Great Western Highway…improvements; each providing improved movement, road safety and/or travel time and reliability on key east-west corridors."*

The NSW Freight and Ports Plan 2018-2023 makes multiple references to the risk carried by forecast increases in traffic on critical supply routes with a specific action to improve *"capacity enhancements crossing the Blue Mountains, including bypasses of Blackheath and Mount Victoria, duplication of the Great Western Highway from Katoomba to Forty Bends"*

The current performance of the corridor constrains local and inter regional traffic. Average daily traffic volumes vary from around 20,000 vehicles per day near Katoomba to around 8,500 vehicles per day towards Forty Bends. Traffic volumes are growing between 1-1.7 per cent per annum. There is a relatively high proportion of heavy vehicles along the corridor (between 12 and 24 per cent) with 18,500 tonnes of freight transported each day (10,300 towards Sydney and 8,500 towards the Central West).

Duplicating the highway from two lanes to four lanes would provide travel time savings for all traffic users and would largely maintain those savings well into the future. Without an upgrade, travel times would worsen, while congestion would continue to deteriorate beyond unacceptable levels.

The upgrade of the remaining 34km of two-lane highway to dual carriageway can significantly improve the resilience of the highway over the existing conditions and provide suitable capacity for future travel demands. Projected traffic demand for Great Western Highway does not warrant a second route crossing that would impact on the Blue Mountains World Heritage Area.

The purpose of the REF is to assess the potential environmental impact of the Proposal as described. The Proposal is consistent with the Government commitments to the highway upgrade and duplication. During the compilation of the REF consideration was given to other strategy and guidance documents including the Blue Mountains Community Strategic Plan 2035 which includes multiple strategies that this project aims to deliver, including:

- 5.2a – Improve the safety, amenity and linkages for the local road network

- 5.2b – Complete the upgrade and widening of the Great Western Highway west of Katoomba so that it delivers improved safety, accessibility, and amenity
- 5.2c – Develop transport links between towns and villages for vehicles (including emergency vehicles), cyclists and pedestrians other than the Great Western Highway
- 5.3a – Advocate for improved rail and bus services
- 5.4a – Provide safe and accessible active transport networks that will improve connectivity and encourage increased confidence in walking and cycling.

The LEP 2015 also notes that the Medlow Bath area…*"is characterised by the historical association of the site with the Hydro Majestic, and the development associated with the tourist and highway uses."* The upgrade and duplication of the existing highway within the road corridor is in keeping with the historical association of the Medlow Bath Township and its relationship to the highway.

In May 2021, the NSW Government announced that Transport would investigate the feasibility of a tunnel between Blackheath and Little Hartley.

Studies have confirmed that two identical (twin) tunnels, one eastbound and one westbound, around 11 kilometres long between Blackheath and Little Hartley is the most viable option and Transport will take this option forward for further development, community consultation and environmental investigation.

Outcomes of the preferred option

The safety of pedestrian crossing and turning movements in Medlow Bath has been the subject of upgrade treatments since 2014 where it was identified for safety improvements amongst a number of other sections of the Great Western Highway. (Great Western Highway - Katoomba to Mount Victoria, Road safety upgrades - Preferred treatments report November 2014)

As detailed within the REF, the Proposal (including a new pedestrian bridge) would address known safety concerns and provide ongoing safety benefits for local traffic and pedestrians, including:

- improved traffic flows which would benefit local and regional traffic. In particular, the upgraded highway would be able to support safer modern high-capacity vehicles that are able to transport more freight per vehicle
- improved safety for vehicles with upgraded intersections at Bellevue Crescent and the Hydro Majestic Hotel including new turning lanes, U-turn Bay, signalisation, lane markings and signage
- minimising potential for pedestrian/vehicle conflicts through the installation of a new pedestrian bridge, stairs and lifts that would provide an accessible path of travel across the highway and to public transport facilities
- enhanced public transport facilities including new kiss and ride and indented bus bays which would provide a safe location for customers to transfer between modes of transport
- a new shared path for pedestrians and cyclists which would help to improve safety, promote better health and encourage tourism by enhancing connections to existing trails. This is not just locally within Medlow Bath but also to provide better connections with the adjoining walking trails.
- making formal provision for commuter parking at Railway Parade, including accessible parking.

4.2.3 Design - Pedestrian bridge

Issue description

In summary, Blue Mountains City Council raised the following issues:

- The proposed singular option has not adequately assessed the loss of for Medlow Bath's key place making elements against the purported improvements to accessibility and connectivity via the proposed pedestrian bridge.
- Some of the mitigation measures required by the proposal, such as the pedestrian bridge, compromise place values. The Transport assessment of a major positive impact over the long term is not agreed. This 'benefit' is overstated in terms of safety and is only achieved through the imposition of a visually adverse structure.
- The case for the pedestrian bridge is not made in the REF, with no catchment data presented to support the likely future use of this structure and thereby failing to justify its significant visual impact on the heritage value of the area - long term neutral impact not agreed.
- Transport and Sydney Trains have recently proposed the demolition of a pedestrian bridge at Woodford (local heritage item), due to under-utilisation. Woodford has a population of 800 people and Medlow Bath 600 people.
- When viewed from the north, the Hydro Majestic will be obscured and visually dominated by the pedestrian bridge, adversely affecting the setting and curtilage of the heritage item.
- An integrated solution, which carefully considers an improved footpath and trails network and a pedestrian bridge option which is less intrusive and sympathetic to the heritage values of the village must be explored.
- With specific reference to the design of the pedestrian bridge (see Appendix 2 for Blue Mountains City Council full submission).

Response:

Bridge Need

As part of the project business case, the need for improved accessibility and safety for pedestrians was identified noting the generally older demographic of residents and visitors to the area. The identification of safety upgrades at Medlow Bath initially links back to the Great Western Highway – Katoomba to Mount Victoria Road safety upgrades preferred treatments report. The need for a safer pedestrian crossing alternative at the Medlow Bath station was bolstered by two serious injury crashes at the pedestrian refuge.

The Transport Access Program (TAP) is an initiative with aims to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport initiatives. To date more than 100 stations across NSW have undergone upgrades as part of this program with another approximately 38 either currently undergoing or planned to undergo upgrades in the near future. The Great Western Highway team has collaborated with the Transport Access Program team in developing the proposal, including lessons learned from other similar projects.

The planned removal of the aged and underutilised bridge at Woodford cannot be compared to the proposed pedestrian bridge as each respond to different objectives for community use and connectivity.

The proposed solution needs to improve safety for pedestrians, while minimising impact to the flow of vehicle traffic on the highway within an urban village centre where elements connect directly with Medlow Bath Railway Station and the key tourist destinations surrounding it. The bridge is provided to accommodate desire lines in both current and future states, while addressing known safety issues and a lack of compliance with current public transport accessibility guidelines.

The following summarised issues were identified with the existing condition:

- The primary desire line for pedestrians to cross the Highway or access Medlow Bath Station involves crossing the rail corridor using the pedestrian level crossing, and then crossing the Great

Western Highway at the pedestrian refuge. Both the refuge and the railway level crossing have a documented history of safety issues which would continue to worsen in the future as traffic volumes on the Highway increase.

- The existing signalised intersection at Station Street / Railway Parade / Great Western Highway is a secondary desire line and would significantly increase travel distance for most pedestrians on a pathway with poor accessibility for vulnerable user groups..
- The existing pedestrian crossing of the Great Western Highway is deemed to be unsafe for pedestrians due to the need to cross four lanes of traffic, without suitable width to provide a compliant refuge in the design.
- The grade on the ramp that provides access between the crossing and the platform does not meet current accessibility standards.

An options report presenting the options and user data considerations that were used to inform the selection and design of the pedestrian bridge is provided in Appendix 5.

The report details the role that heritage, visual impact and accessibility requirements played in developing the design. In addition, lighting for the bridge has been considered to minimise its visual impact – refer to Appendix 6 for further information on the lighting design.

4.2.4 Consultation

Issue description

In summary, Blue Mountains City Council raised the following issues:

- The REF was on public exhibition for a period from 26 July 2021 to 25 August 2021. The Act prescribes a “minimum” exhibition period for a proposal of national importance.
- The restricted public exhibition period provides an inadequate opportunity for public engagement.
- Transport prioritising the 2022 construction program over engagement.

Response:

As per Section 1.2 of this report, Transport carried out public consultation period for the REF from Tuesday 27 July until Sunday 5 September 2021. During this time Transport invited feedback from the community and stakeholders on the REF and the concept design for the upgrade of the Great Western Highway through Medlow Bath.

Formal feedback was invited by all interested stakeholders and was widely promoted within the Blue Mountains, the Central West and Western Sydney via newspapers and radio segments.

Due to COVID-19 guidelines and a stay-at-home order put in place for Greater Sydney (Blue Mountains) in June, Transport was unable to offer face to face consultation. During the display of the REF the following actions was taken by the Transport for NSW team to help ensure that all stakeholders had opportunity to review the documentation and make a submission:

- Extension of the display period to enable the additional time to consider information
- Provision of online sessions in lieu of traditional face to face consultation, with Transport staff guiding attendees to the appropriate section of the documents that addressed the topic raised.
- Individual phone consultations were made available and encouraged.
- Provision of two additional online sessions as part of the extended display period.
- Provision of hard copies of the REF delivered to local community members on request.
- Provision of a reply-paid submission form.

The Community Consultation Summary Report (refer to Appendix 3) further summarises the community engagement activities carried out during the display of the Medlow Bath REF.

Transport appreciates that the consultation process varied from traditional REF displays as the resources and information sessions were primarily online. Transport extended the display period and added extra consultation sessions to allow extra time for the information to be reviewed, considered and a considered submission provided.

The detail of the submissions and issues raised and the volume of submissions indicates engagement with the stakeholders during the display period was adequate. Key aspects raised in the submissions will be considered in the detailed design of the project and management of the project during construction.

Other REFs for the Great Western Highway Upgrade Program are being completed and are expected to be on public display in late 2021 and by early 2022. These packages are:

- Little Hartley to Lithgow (Late 2021)
- Katoomba to Blackheath section (early 2022).

As COVID restrictions continue to ease, face to face consultation is scheduled for both these REF displays.

Transport has sought planning advice throughout the design development as well as during the consultation phase. All levels of government have a vested interest in the success of the project. The feedback provided by Blue Mountains City Council has been considered in detail in regard to the determination of this project.

4.2.5 Non-Aboriginal heritage

Issue description

In summary, Blue Mountains City Council raised the following issues:

- The extent and severity of heritage impact across these three heritage items as assessed by Transport's own heritage consultant (based on 20 per cent design package), is sufficient to warrant comprehensive assessment under an EIS.
  - Hydro Majestic Hotel (listed heritage item MB002).
  - Medlow Bath Railway Station (listed heritage item MB003).
  - Avenue of Trees (listed heritage item MB015).
  - Cultural, aesthetic and historical values of the village of Medlow Bath as identified in LEP 2015.
- The REF identifies the impact on the Hydro Majestic as a result of the proposal to be "moderate to major" but then concludes under clause 228(e) that the results of the project will be a short and long term minor negative impact. This is not agreed.
- The Hydro Majestic has been photographed for over a century but not in the REF. This omission is glaring in the context of the heritage assessment within the REF.
- Any consideration of the physical intrusion of the four-lane highway on the Hydro Majestic and its curtilage is absent from the REF.
- The REF does not consider the heritage value of the Avenue of Trees. This is in direct contrast to the previous detailed work done by Council, in collaboration with Transport.
- This will be largely removed if the proposal in its current form proceeds replaced by road infrastructure across the full width of the corridor, eliminating the Hydro Majestic's long built form and landscape setting. This is unacceptable.
- Conversely, the proposal for a median planting goes against the adopted principle for an avenue of trees as per the Urban Design Framework (UDF 2019).
- The recommendations of the Statement of Heritage Impact (SoHI) make it clear that a heritage architect must be engaged, and a detailed design should aim to further minimise the impact of the Proposal.
- With particular reference to the pedestrian bridge through the use of appropriate form, proportion and materials.

Response:

SoHI within the REF

The REF included the Statement of Heritage Impact (SoHI) which was prepared for the proposed project and assessed the proposed works to the road as well as the preliminary design of the new pedestrian bridge and modifications to the train station. The SoHI also included recommendations of measures to avoid or minimise impact, and any approvals required under the *NSW Heritage Act 1977*.

This SoHI was prepared in accordance with the relevant heritage guidelines, and the level of impact assessed is in accordance with the Material Threshold Policy (Heritage NSW, 2020). This SoHI followed industry best practice in terms of detailed assessment and provided a definition of potential impact of the Proposal on the items significance.

It was identified that the proposed works would have a major impact physically or visually on the following heritage items:

- Station (visual)
- Avenue of Trees (physical)
- Hydro Majestic (visual)
- Melbourne House, Cosy Cot, Sheleagh Cottage (visual)

- Urunga (visual)
- Advertising Sign (physical and visual).

Impacts to the above were mainly associated with the installation of the new pedestrian bridge. The SOHI recommended that the detailed design should "be developed and refined in consultation with either a heritage architect or a built heritage consultant".

Statement of Heritage Impact for the Station and new Pedestrian Bridge

The development of the detailed design of the project (including duplication of the road as well as design of the bridge and station) involved co-ordination of the design team from the beginning of the concept design. In addition to reviewing documents and plans, fortnightly design workshops were held and attended by the main architect, urban design advisors (from the design team and from Transport), environmental specialist, heritage consultant as well as others from the general design team (eg civil engineer). This approach ensured that the design met the design objectives and required standards as well as mitigating impacts to heritage items.

In particular, suitably qualified heritage specialists from RPS provided advice in regard to the potential impacts of the design to key heritage items, as well as reviewing and advising upon design options.

The purpose of this was to assess the impact of the Proposal on the Medlow Bath Railway Station (State heritage listed item). As detailed above, heritage consultants attended multiple design workshops as well as reviewing the 80% design plans for the project. This review included assessment of potential impacts associated with:

- Construction of a new pedestrian bridge
- Alterations to northern station entrance
- Platform upgrades
- Modifications to Railway Parade and Great Western Highway
- Decommissioning and removal of existing pedestrian level crossing
- Electrical upgrade work including lighting
- Relocation of overhead wiring structures
- Placement of 11kV aerial line underground
- Ancillary work
- Use of ancillary facilities

Following our ongoing engagement with Heritage NSW and Blue Mountains City Council, the bridge design and station precinct is continuing to progress through a series of design challenge workshops to improve its fit with the surrounding heritage context.

Heritage and architectural specialists will be working with key stakeholders to develop the heritage experience between Medlow Bath Station and the Hydro Majestic in a manner that draws in local context and character. This will be required as part of the Works Application under Section 60 The Heritage Act 1977.

Further community information sessions will be held as the design matures, to engage the community on progress made.

Impacts on the Avenue of Trees

The REF SoHI identified major physical impacts to the Avenue of Trees and the Advertising Sign. In regard to the locally listed Avenue of Trees, The original avenues of trees consisting of Radiata Pines are no longer present as have been replaced by Western Red Cedars (i.e. there is a history of replacement of these trees with the heritage value remaining intact). The current Western Red Cedars are in poor health and are unlikely to survive regardless of the project. The landscape design will provide a new avenue of

trees in the median that responds to the original Avenue of Trees. This represents another replacement of trees along the Avenue to ensure the heritage item survives in the long term.

4.2.6 Transport and traffic

Issue description

In summary, Blue Mountains City Council raised the following issues:

- Although the introduction a heavier class of freight vehicles from Lapstone to Lithgow and intensification is likely, this is not canvassed in the REF.
- Great Western Highway design will permit posted speeds of 80 or 100 km/h from Katoomba to Lithgow, with one exception, slow point of 60km/h at Medlow Bath. The decision to use the existing corridor will compromise highway performance during peak periods as capacity is reached.
- The proposed introduction of a signalised intersection will compound this problem.
- The potential traffic impacts assessment of the road network performance does not appear to have assessed the weekend peak hour, which is relevant in the upper Blue Mountains given tourist traffic.
- The importance and impacts of the freight corridor needs further assessment and the opportunity for the delivery of the local link road strategy should be considered.
- The loss of on-street parking as result of the highway widening has not been adequately addressed.
- Parking to be accommodated in the future development of the Hydro Majestic is not supported.
- Transport need to provide a more thorough and detailed assessment for the replacement of parking for the village as a whole.
- Council seeks confirmation that on-road cycling pathways conform to best practice standards.
- The cycling comfort of bitumen over concrete is another important factor that needs to be considered when implementing the shared path.
- What are the impacts of the **U-turn bay** on the intersection performance?
- With respect to the alternate **Bellevue Crescent**, this also present a serious negative impact to the local road network and residential amenity.
- There needs to be an assessment on the current road infrastructure of Bellevue Crescent to support the increase in traffic as residents would now be using the current cul-de-sac section of the road to access the new signalised intersection near the petrol station.
- This alternate option would require acquisition of land and would have an adverse impact on future development of the Hydro Majestic and the implementation of a development application assessed as regional development.
- The REF overstates the positive impact for a proposal that introduces potential safety impacts though introduction of four and five lanes and potential introduction of larger classes of heavy vehicles within the corridor.
- The upgrade should also be considered in the context of the safety outcomes sought in the Council's adopted Links Road Strategy in 1999 as called up in its Community Strategic Plan. The relevant objectives can be found in Appendix 2 – Blue Mountains City Council full submission.

Response:

Traffic

The Traffic and Transport Assessment included within the REF identified that the Proposal would improve the existing performance of the highway, including accommodating future increases to traffic volumes to 2036. The assessment also identified that alterations to the existing alignment, particularly the signalised control system and U-turn bay at Bellevue Crescent and the addition of right turn bays eastbound into key amenities, would improve the safety of vehicles and the community.

The assessment noted that there was a significant increase in weekend traffic with a 22-42 per cent increase in weekend traffic volumes at intersections compared to weekdays. The modelling identified that even though there was an increase in traffic the road network performed excellently (Section 4.1 of the REF).

Weekend peak hour traffic (14:30 – 15:30) was also modelled at the intersection of Great Western Highway and Railway Parade (including Station Street). The modelling identified that the intersection performed to an acceptable level, longest average delays would be 51 seconds (at Station Street) and queue lengths are acceptable.

Parking

The Traffic and Transport Assessment noted that the Proposal would result in the following parking impacts:

- The commuter car park at Railway Parade would be formalised to provide nine parking bays to accommodate commuters currently parking on the highway
- Two kiss and ride bays would be provided at Railway Parade
- The loss of around 39 public car parking spaces along the western side of the Great Western Highway

The loss of parking outside the Hydro Majestic has been previously considered and the removal; acknowledged by conditions on the existing Development Consent for the property which identified that the frontage would become a 'no standing' zone. Transport has confirmed that Blue Mountains City Council, through a development assessment process, formally advised Hydro Majestic in 2010 that parking on the Highway could not be relied upon or assessed as that land was reserved for future widening of the highway.

The consideration of the public parking on the Great Western Highway aligns with Blue Mountain City Council 'Citywide Parking Strategic Plan 2018'. The solitary action included in this plan for the Medlow Bath precinct was: '*MB.1 - ensure implementation of DA conditions of consent relating to parking and highway safety for the Hydro Majestic'*. During longitudinal studies to inform this strategy, parking demand on the 39 parking spaces available in Medlow Bath reduced from 28% in the 2010-2012 period to 18% in the 2015-2016 period which equates to a public car parking demand of seven (7) spaces.

Based on feedback from the REF display, a further review was undertaken to consider public parking demand on the highway. A review of available aerial imagery from 2015 to 2021 identified an average of thirteen (13) spaces. We recognise that there are peak periods during special events, such as; the Roaring 20's festival, historic steam train visits and snowfall events, that generate peak usages of available space in Medlow Bath.

There is no proposal to accommodate public parking within the Hydro Majestic curtilage. All parking within the Hydro Majestic relates to the approved Development Application consent and are required by the Hydro Majestic for the parking demand generated by their development. Transport for NSW recognises the public demand for accessible and convenient parking and the relationship the current Hydro Majestic has with visitors to Medlow Bath. TfNSW will investigate in partnership with BMCC opportunities to provide additional public parking spaces within Medlow Bath to accommodate future demand.

The formalisation of parking in Railway Parade seeks to offset the percentage of this public parking on the highway that is currently being used by rail commuters. Transport is continuing to work with Blue Mountains City Council to consider ways to further improve and better define public parking areas in Medlow Bath to prevent overflow parking in local streets during the special events that increase parking demand.

Following further discussions with BMCC on public parking options, TfNSW is now also committed to formalising an additional 13 spaces along the roadside frontage of Medlow Park..

Transport is continuing to work with both Blue Mountains City Council and Hydro Majestic to better appreciate the future parking demands of this iconic development, while considering ways to reduce the impact that widening construction, public parking demand and the future operation of the highway may have on this development.

Bellevue Crescent Option

The alternate Bellevue Crescent option will not be progressed. The preferred option (ie upgrade of the existing Bellevue Crescent intersection and inclusion of a U-turn bay) has been retained in the detailed design.

Safety

As previously demonstrated in the Review of Environmental Factors, sections of the already upgraded Great Western Highway through the Lower Blue Mountains have realised a significant reduction in road trauma through provision of signalised intersections, pedestrian bridges, separate active transport facilities and improved alignment. Previously upgraded sections have realised approximately 77% reduction in fatalities and 28% reduction in crash rates overall.

Improving road safety for all users is primary project objective that has underpinned the design of the Medlow Bath Upgrade. This is a key motivation in the provision of a pedestrian bridge, removal of the railway level crossing, removal of the existing pedestrian refuge, widening of the pedestrian pathways, provision of traffic barriers and maintaining a speed limit of 60km/hr through the section.

Transport have also committed through the Medlow Bath Upgrade to providing improvement works on Railway Parade to address safety issues on this important local road.

4.2.7 Environmental Quality

This section covers the following topics: urban design, landscape character, locality and visual impact

Issue description

In summary, Blue Mountains City Council raised the following issues:

- The landscape outcomes proposed in the REF must be re-evaluated to respond to the Urban Design Framework (UDF 2019) for Katoomba to Mt Victoria duplication and retain the heritage and landscape values of the Medlow Bath village centre.
- The REF suggests that the outcome of the Proposal will be the "maintenance and enhancement of the local amenity and character of Medlow Bath" The REF does not explain the basis upon which that conclusion is reached.
- The regional economic development is a national and NSW Government objective but one difficult to achieve when set against the last objective of the Proposal, which is to: 'Maintain and enhance local amenity and character and protected environmental and cultural asset'.
- These regional level benefits appear to carry disproportionate weight in the assessment and adverse impacts on local community are diminished.
- The regional highway duplication and proposed four and five lane regional highway through the centre of the village would be the most significant transformation of Medlow Bath since its foundation, which on balance represents a significant negative impact on locality. The TNSW assessment of a minor positive impact over the long term is not agreed.
- The Proposal is in opposition to Council's recent Local Character Statement, which supports Council's Local Strategic Planning Statement: Living Sustainably 2040.
- The use of exotic tree plantings in the upper mountains towns provides a clear distinction between the village settings and their native surrounds.
- Refer to Strategic Urban Design Principles given for Medlow Bath in UDF 2019.
- The selection of a deciduous species as the median tree planting is not consistent with the heritage and landscape setting qualities of the previous and current avenue, which is required to comprise evergreen species, with specific colour selection and silhouette.

Response:

The Urban Design, Landscape Character and Visual Impact Assessment (Spackman Mossop Michaels, 2021) that was included within the REF (an updated version forms Appendix 4 of this document) references the Urban Design Frameworks (UDF) for Katoomba to Mt Victoria and Lapstone to Katoomba.

Section 3.4.5 of the Spackman Mossop Michaels report identified that the design should consider that settlements along the Great Western Highway have a pattern that should reinforce the 'string of pearls' formation. This includes the consideration of including transition zones between enclosed bushland and the main village area as well as each "pearl" to have its own character. These aspects were considered within the urban design by:

- incorporating the natural and cultural scenic qualities of the area into the urban and landscape design to enhance the visual identity of Medlow Bath
- using landscape elements within the Proposal area to differentiate the character of different transition zones that highlight settlement patterns along the Proposal.

Section 6 of the Spackman Mossop Michaels report includes the details of the Landscape Character Assessment which provided the framework for the Landscape Design. As stated within Section 8.1 of the Spackman Mossop Michaels report, the planting design "aims to provide a well-vegetated gateway into Medlow Bath that integrates the roadway and pedestrian bridge structure with their surrounding landscape and provides motorists, as well as cyclists and pedestrians, with a 'sense of place'."

4.2.8 Surface water quality and hydrology

Issue description

In summary, Blue Mountains City Council raised the following issues:

- Council acknowledges the partnership with Transport in the establishment of the Water Quality Working Group.
- The key threatening processes of increased stormwater run-off and decreased water quality have not been adequately considered in the REF.
- The REF does not provide a detailed assessment of the identified threatened swamp communities and any potential impacts from stormwater discharges or proposed mitigation measures to address these impacts. Stormwater impacts should be represented visually by showing stormwater discharge locations in reference to the identified swamp locations.
- The REF does not identify or address potential increased flooding risk to downstream residential areas adjacent to overflow paths to Adams Creek below the Medlow Park Basin.
- Does not include explicit design specifications for the Stormwater detention and bio-retention basins.
- The REF does not identify/consider potential for alterations of pH associated with the widespread use of certain types of concrete, containing fly ash and concrete aggregates as well as the deleterious impacts of alkalisation on aquatic habitats and downstream swamps (Blue Mountains World Heritage National Park environment context).
- Given the significance of these endangered communities and the substantial nature of the proposed works and potential for hydrological disruption, such impacts should be considered potentially significant, and should be addressed in an EIS.

Response:

The proposed detention basin is located on the eastern side of the rail alignment south of Medlow Park. This basin will capture the water from the northern sections of the Great Western Highway and Railway Parade. Its outflows will discharge into the existing rock lined channel in the park (as described in the REF). The catchment for Medlow Bath is isolated to the project area with only a small volume of water discharged to the neighbouring catchment. Mitigation measures will capture and treat the stormwater discharging to the adjacent area during construction and interim operation, and operational management will be detailed in the adjoining works package.

The design of the water basin in Medlow Park has been refined since the REF was issued in July 2021, including the following refinements:

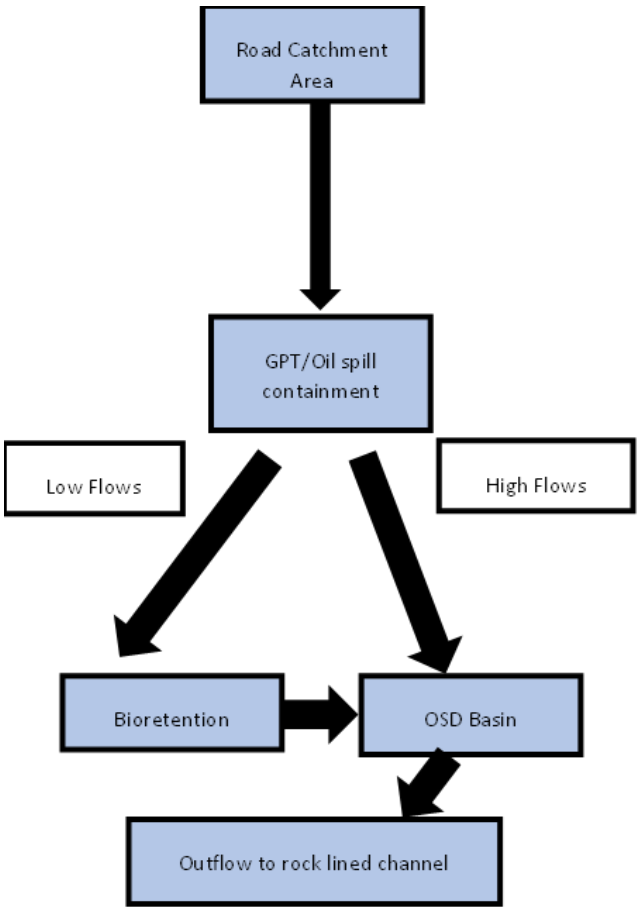
- The sizing of the basin has been completed based on capture runoff from the proposed road upgrade works, rail corridor areas and upstream catchments of the road alignment
- The basin design has been updated to include two separate storage areas with a pipe provided between them to reduce the overall depth of the basin, facilitating an ‘open to public’ park design. The design of the sediment basin accounted for 1% AEP storm events and includes allowance for climate change.
- The storage volume provided is approximately 1,300m^3 (1% AEP Top Water Level in top basin = RL1043.25m AHD and 1% AEP TWL in bottom basin = RL1041.36m AHD) which is contained within the above-ground system with a minimum 150mm freeboard provided from the TWL to the top of the basin embankment (RL1043.54m AHD in top basin and RL1041.6m AHD in bottom basin)
- Discharge is controlled via a 600mm diameter outlet pipe in order to satisfy pre-post conditions.

Water will be treated within this system by using the following:

- Gross Pollutant Trap (GPT) in the form of a site specific Baramy Single Vane GPT, (or approved equivalent. This system is provided to manage gross solids, and will capture large pollutants (including leaves and litter) as well as including spill management for liquid pollutants such as petroleum and oil spills;
- Bioretention system incorporated within the onsite detention basin to treat the water prior to discharge. The bioretention basin contains water tolerant plant species to facilitate nutrient removal. This is achieved by sediments and attached pollutants (including nutrients, metals, and other soluble pollutants) being removed via filtration through the vegetative surface layer and filter media below; and
- In addition to biofiltration areas, groundwater penetration will be encouraged through detention basin design which will promote natural filtration within the detention area. The dry basin will be planted out in a manner to prevent ingress of noxious weeds. It will be surrounded by sandstone block edgings to minimise the use of concrete and gabion basket devices, which will reduce maintenance and debris build up that can reduce the effectiveness of the basin system.

Transport is committed to offsetting impact to the Elsie Langford Centre by working with the Langford family members and with Blue Mountains City Council to fund further secondary water quality improvement works downstream of the basin in Medlow Park.

As per the REF, the treatment process to ensure water quality is as follows:

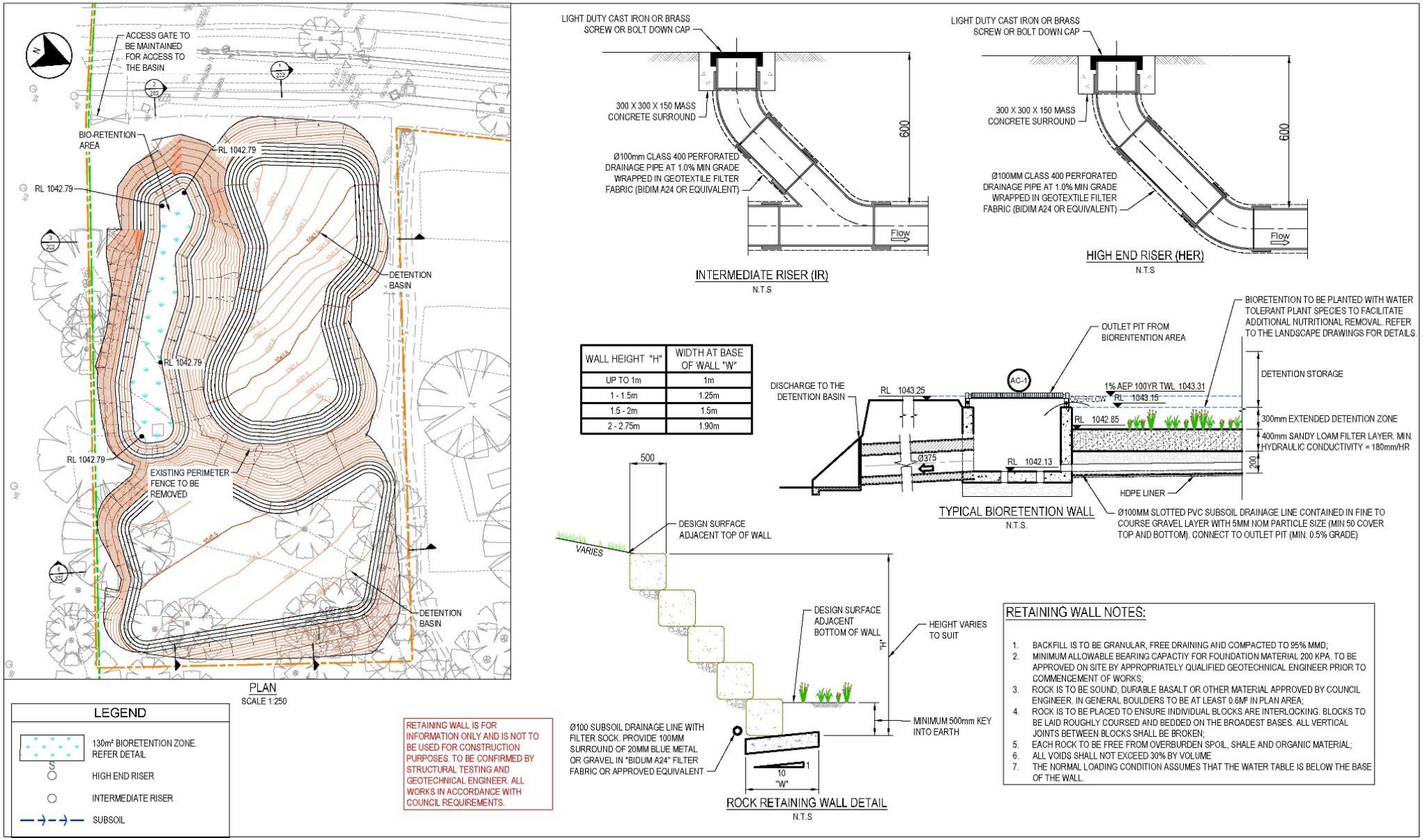


Analysis of the proposed system was undertaken using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) – as per WaterNSW guidelines. Results of the MUSIC analysis confirm that the mean annual loads for the total phosphorus, nitrogen, suspended solids, and gross pollutants generated on the developed subject site are less than the pollutants generated in the existing state and achieve the NoRBE requirements.

It is noted that secondary treatment is also proposed downstream of the existing rock lined channel, which would be installed by Blue Mountains City Council, with funding for this treatment to be provided by Transport. This is proposed to be both a compensatory offset for the removal of the Elsie Langford Centre (in line with Council's Plan of Management) and a "value add" system, to provide additional treatment considering the sensitive nature of the downstream receiving waters. However, it should be noted that all requirements and targets are being met with the proposed works as outlined above, without inclusion of consideration of the downstream secondary treatment system.

Transport is committed to further understanding results of recent scientific studies that raises concerns with the impact of increasing pH levels on Blue Mountains Hanging Swamps and seeks ongoing partnership with Council to explore opportunities to achieve best practice in water quality design as part of delivering the Great Western Highway Upgrade Program. Transport specifies the avoidance of flyash containing concretes in construction methodologies and will continue to establish the use of quality materials via its design and construction specifications.

Further details of design of the detention basin developed in partnership with Blue Mountains City Council and WaterNSW is on the following page and within Appendix 7. An assessment of potential cumulative impact can be found in Appendix 8.


ACCESS GATE TO BE MAINTAINED FOR ACCESS TO THE BASIN
BIO-RETENTION AREA
RL 1042.79
RL 1042.79
RL 1042.79
RL 1042.79
DETENTION BASIN
EXISTING PERIMETER FENCE TO BE REMOVED
DETENTION BASIN
PLAN
SCALE 1:250
LEGEND
130m² BIORETENTION ZONE. REFER DETAIL
HIGH END RISER
INTERMEDIATE RISER
SUBSOIL
RETAINING WALL IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES. TO BE CONFIRMED BY STRUCTURAL TESTING AND GEOTECHNICAL ENGINEER. ALL WORKS IN ACCORDANCE WITH COUNCIL REQUIREMENTS.
LIGHT DUTY CAST IRON OR BRASS SCREW OR BOLT DOWN CAP
300 X 300 X 150 MASS CONCRETE SURROUND
Ø100mm CLASS 400 PERFORATED DRAINAGE PIPE AT 1.0% MIN GRADE WRAPPED IN GEOTEXTILE FILTER FABRIC (BIDIM A24 OR EQUIVALENT)
600
Flow
INTERMEDIATE RISER (IR)
N.T.S
LIGHT DUTY CAST IRON OR BRASS SCREW OR BOLT DOWN CAP
300 X 300 X 150 MASS CONCRETE SURROUND
Ø100MM CLASS 400 PERFORATED DRAINAGE PIPE AT 1.0% MIN GRADE WRAPPED IN GEOTEXTILE FILTER FABRIC (BIDIM A24 OR EQUIVALENT)
600
Flow
HIGH END RISER (HER)
N.T.S
WALL HEIGHT "H" | WIDTH AT BASE OF WALL "W"
UP TO 1m | 1m
1 - 1.5m | 1.25m
1.5 - 2m | 1.5m
2 - 2.75m | 1.90m
500
VARIES
DESIGN SURFACE ADJACENT TOP OF WALL
DESIGN SURFACE ADJACENT BOTTOM OF WALL
H
HEIGHT VARIES TO SUIT
MINIMUM 500mm KEY INTO EARTH
Ø100 SUBSOIL DRAINAGE LINE WITH FILTER SOCK. PROVIDE 100MM SURROUND OF 20MM BLUE METAL OR GRAVEL IN "BIDUM A24" FILTER FABRIC OR APPROVED EQUIVALENT
10
1
"W"
ROCK RETAINING WALL DETAIL
N.T.S
DISCHARGE TO THE DETENTION BASIN
RL 1043.25
AC-1
OUTLET PIT FROM BIORENTENTION AREA
BIORETENTION TO BE PLANTED WITH WATER TOLERANT PLANT SPECIES TO FACILITATE ADDITIONAL NUTRITIONAL REMOVAL. REFER TO THE LANDSCAPE DRAWINGS FOR DETAILS.
1% AEP 100YR TWL 1043.31
OVERFLOW
RL 1043.15
RL 1042.85
DETENTION STORAGE
300mm EXTENDED DETENTION ZONE
400mm SANDY LOAM FILTER LAYER. MIN. HYDRAULIC CONDUCTIVITY = 180mm/HR
200
Ø375
RL 1042.13
HDPE LINER
Ø100MM SLOTTED PVC SUBSOIL DRAINAGE LINE CONTAINED IN FINE TO COURSE GRAVEL LAYER WITH 5MM NOM PARTICLE SIZE (MIN 50 COVER TOP AND BOTTOM). CONNECT TO OUTLET PIT (MIN. 0.5% GRADE)
TYPICAL BIORETENTION WALL
N.T.S.
RETAINING WALL NOTES:
1. BACKFILL IS TO BE GRANULAR, FREE DRAINING AND COMPACTED TO 95% MMD;
2. MINIMUM ALLOWABLE BEARING CAPACTIY FOR FOUNDATION MATERIAL 200 KPA. TO BE APPROVED ON SITE BY APPROPRIATELY QUALIFIED GEOTECHNICAL ENGINEER PRIOR TO COMMENCEMENT OF WORKS;
3. ROCK IS TO BE SOUND, DURABLE BASALT OR OTHER MATERIAL APPROVED BY COUNCIL ENGINEER. IN GENERAL BOULDERS TO BE AT LEAST 0.6M³ IN PLAN AREA;
4. ROCK IS TO BE PLACED TO ENSURE INDIVIDUAL BLOCKS ARE INTERLOCKING. BLOCKS TO BE LAID ROUGHLY COURSED AND BEDDED ON THE BROADEST BASES. ALL VERTICAL JOINTS BETWEEN BLOCKS SHALL BE BROKEN;
5. EACH ROCK TO BE FREE FROM OVERBURDEN SPOIL, SHALE AND ORGANIC MATERIAL;
6. ALL VOIDS SHALL NOT EXCEED 30% BY VOLUME
7. THE NORMAL LOADING CONDITION ASSUMES THAT THE WATER TABLE IS BELOW THE BASE OF THE WALL.

4.2.9 Biodiversity

Issue description

In summary, Blue Mountains City Council Blue Mountains City Council raised the following issues:

- The REF has not adequately assessed or understood the potential long term adverse impacts on the ecosystems of the locality.
- The potential indirect impacts on biodiversity values outside of the construction curtilage must also be addressed.
- This includes detrimental adverse impacts to threatened ecological communities and their associated threatened eg, Blue Mountains Swamps, Blue Mountains Water Skink and Giant Dragonfly (in nearby BMNP).
- The Threatened Ecological Communities and their associated threatened species are highly susceptible to the impacts of increased stormwater discharges into their headwaters.

Response:

Assessment of flora and fauna outside of project footprint

The Biodiversity Assessment, carried out to the requirements of the EP&A Act, was completed for the REF to assess the potential biodiversity impacts of the Proposal. The background research for this assessment included a review of ecology information sources for a 10 kilometre radius of the Proposal. This information was used to determine the likelihood of occurrence within the habitat assessment.

The assessment identified that there were no threatened ecological communities (TECs) within the study area, but that there was a State and Commonwealth listed TEC occurring outside and northeast of the study area in the form of Temperate Highland Peat Swamp on Sandstone (THPSS) endangered ecological community (EEC) – located 250-500 metres downstream from the study area.

The location of this EEC relative to the study area is shown in the following figure (Figure 4.1) from the REF (RPS, 2021).

This threatened ecological community provides unique habitat conditions for species such as the Blue Mountains Water Skink (Eulamprus leuraensis), Giant Dragonfly (Petaleura gigantea) and Carex klaphakei.

The biodiversity assessment identified that no direct impact on aquatic habitat is expected, provided that flows into Adams Creek are appropriately mitigated and managed. Implementation of construction and operational water treatment and control will improve the water quality of water being released (refer to Appendix 7).

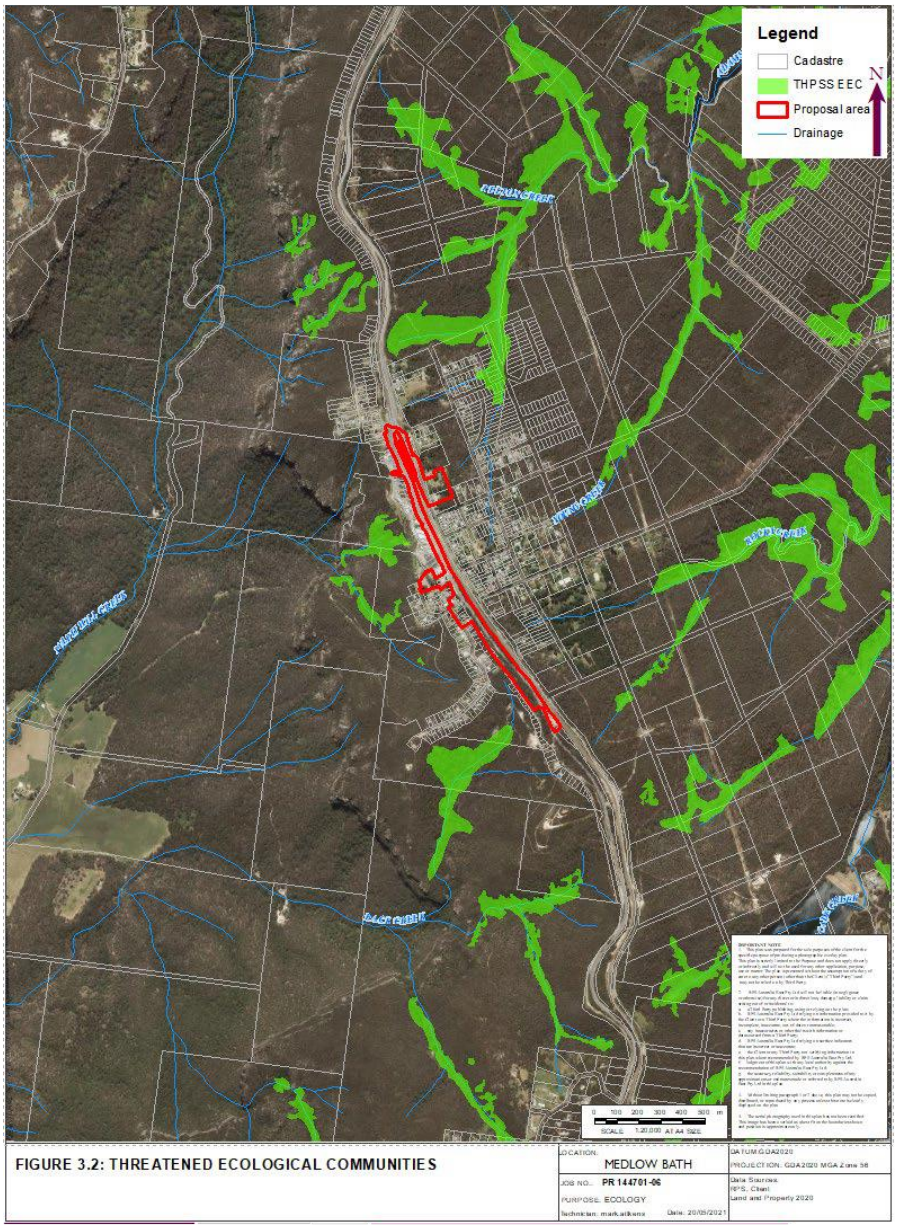


Figure 4.1: Location of Temperate Highland Peat Swamp on Sandstone (THPSS) endangered ecological community

<u>Protecting downstream areas by use of a water quality detention basin</u>

Refer to Section 4.2.8 - Surface water quality and hydrology for information on how the detention basin would maintain high water quality.

4.2.10 Cumulative impact

Issue description

In summary, Blue Mountains City Council raised the following issues:

- The REF fails to appropriately identify the activity and, in the case of Medlow Bath works, the REF fails to consider the cumulative environmental impacts of the upgrade works in association with the proposed upgrades between Katoomba and Blackheath.
- Clause 228(2)(o) (EP&A Regulation) requires TNSW to consider the cumulative impacts of a proposed activity, with other likely or future activities, when determining whether an EIS for the activity is required.
- Transport has not assessed cumulative impacts and the omission of that assessment constitutes a non-compliance with the requirements of clause 228. That omission, in itself, points to the inadequacy of the REF as a mechanism for determining the likely impacts of the proposed works on the environment.

Response:

An assessment of potential cumulative impacts has been undertaken and is attached to this submission report, in Appendix 8.

Potential cumulative impacts of concurrent projects in the area are also considered within the assessment as per Clause 228 (1) of the Environment Planning & Assessment Regulation 2000 (EP&A Regulation). Transport for NSW will continue to carry out cumulative impacts assessments as the program progresses as per the DPE cumulative impact assessment guidelines, in which the Katoomba to Blackheath section will be considered in its entirety, including Medlow Bath. Assessment of cumulative impact potential has been undertaken with known and likely information. Given the sequential rollout of the Great Western Highway Program, the project can assess impacts across the program and adopt mitigation and management measures as required.

4.3 NSW Rural Fire Service

4.3.1 General support

Issue description

Based on review of the REF, the NSW RFS 'will certainly work with Transport and the contractors to ensure this important project is completed'.

NSW RFS provides supportive general comments on access and hydrology during the Proposal's construction and operation.

Response

Transport acknowledges the support for the project by NSW RFS and is committed to continued collaboration with NSW RFS during the detailed design phase of the project.

4.3.2 Access (Construction)

Issue description

In summary, the NSW Rural Fire Service raised the following issues:

- Provide 24hr contact of construction site supervisor(s) to RFS.
- Maintain access to/egress from the front of the Fire Station 24/7 – for the full width of apron throughout construction activities – i.e. cover any open trenches with suitable road plates and/or half construction at a time
- Access control – with restricted access during construction, minimise risk of members of the public parking near the railway station causing interference with access to Fire Station.
- Unplanned access (for emergency use) 24/7 to rear compound (if gates can be dual keyed with an RFS supplied lock).
- Planned access to rear compound with 24hrs notice.
- If possible, provide access to overflow parking for 8-10 vehicles south of the Fire Station and the southern end of the tennis court reserve.
- Allow for a rigid bulk water carrier to traverse the site to access the Air Field off Rutland Road if required.

Response

Transport will co-ordinate with the NSW Rural Fire service to ensure that access to their property is not hampered during the construction works. Transport will also ensure that the works contractor will provide assure 24hr access to the NSW Fire Service premises.

To offset the impact of providing commuter parking on Railway Parade opposite the station, Transport will formalise parking within the RFS site for first response staff vehicles and provide additional space in front of Medlow Park or within the proposed compound area beside the current RFS property to cater for up to 10 vehicles.

4.3.3 Hydrology and drainage

Issue description

In summary, the NSW Rural Fire Service raised the following issues:

- Permanent measures: Type SB dished crossing along width of Fire Station apron, drained into site retention basin.
- Temporary measures (during construction): Rolled profile asphalt (AC) to prevent storm water flooding the Fire Station.

Response

The drainage design including dish drained crossings in front of the Fire Station will be captured during the Detail Design phase. Transport will co-ordinate with the NSW Rural Fire service to ensure adequate stormwater measures are implemented during construction.

4.4 Sydney Water

4.4.1 Utilities

Issue description

In summary, the Sydney Water raised the following issues:

- Sydney Water asset protection requirement.
- Potentially rigorous asset relocation assessment and overheads on Transport.
- Specialist Engineering Assessment (SEA) is required when the proposed works are within the zone of influence of a Sydney Water asset.
- Adjustment designs should consider the time to connect to the live system to minimise impact on customers.
- Possible upsizing required for existing trunk infrastructure and requirements for additional trunk infrastructure.
- Any trade waste licence request, most notably for discharge of leachates to a SW Wastewater asset will need to meet SW's requirements.
- There are environmental approval needs to meet the discharge protocols of chlorinated water due to water main shutdown and reconnection of live SW assets that require adjustment.
- SW needs to be notified if any contamination is identified near our assets and rectification if caused by the Proposal.

Response

Transport would consult with Sydney Water before construction work and as part of design certification processes. This would determine the requirements for access to, protection or relocation of services. Where possible, disruption to existing services would be minimised and work would be staged. Local residents and businesses would be notified before any planned disruption. The replacement of utilities would be considered in the project cost.

4.4.2 Consultation

Issue description

In summary, the Sydney Water raised the following issues:

- Collaborative work between SW and Transport required on water and wastewater servicing final design.

Response

Transport would continue to consult Sydney Water in relation to water and wastewater servicing final design.

5. Responses to submissions from community organisations and individuals

Transport received a combined total of 348 submissions from 250 community organisations and community individuals in response to the REF consultation. These include:

- A total of 9 different community groups.
- A total of 237 individual members of the public.

Where submissions received from separate community groups/individuals cover the same topic, responses to those submissions are combined.

The submissions received by community groups and individuals are predominantly supportive of the need for the Proposal based on the improvements in traffic performance, accessibility, safety and amenity.

The reservations to the Proposal raised in these submissions mostly relate to the aspects detailed in Sections 5.1 - 5.23.

Appendix 1 provides the list of individual responses and the relative sections that provide the response to the issues raised. These responses are provided in the following sections.

5.1 Consultation

Issue description

In summary, the community organisation and individual respondents raised the following issues:

- Inadequate time given to read the REF and have structured, meaningful questions to ask. Consultation period needs to be extended.
- Request for consultation periods to be extended to the end of the current lockdown to allow for face-to-face community meetings with all of the relevant stakeholders.
- There was no one-on-one consultations with impacted property owners
- Online consultation sessions were conducted via Microsoft Teams which is not a commonly used platform for meetings in the community. Despite a request to the contrary, there was only refusal to use the commonly used platform of 'Zoom'.
- Sometimes, local internet strengths were insufficient. Often people were too lacking in confidence or computer skills to actively participate
- The community was advised that the questions in the chat column would be posted online, together with the answers. This was subsequently rescinded.
- We feel that Transport has used COVID restrictions as the perfect timing and way to steam roll local residents and not allow them proper consultation.
- The Medlow Bath Residents Association (MBRA) must be consulted as to the final location and orientation of the bus shelter.
- There are four sessions in total being held over the space of a week and due to COVID these are all being completed online. The lack of notice of these forums also seems very underhanded.
- Recommence consultations with Blue Mountains stakeholders including Blue Mountains City Council,
  Conservation Australia, Water Board and Dharug and Gundungarra Nations people.

Response

Refer to response in Section 4.2.4 Consultation.

5.2 Environment – EIS and Cumulative Impact

Issue description

In summary, the community organisation and individual respondents raised the following issues:

- Current REF process for the proposal is fundamentally flawed because it does not take into account the ‘’significant” cost and environmental impacts of the Katoomba to Medlow Bath.
- Requirement for the Medlow Bath village section be halted and a full Eastern Section EIS encompassing Katoomba to Blackheath be conducted.
- Transport provides an inferior REF, to avoid having to address the impact on ecologically sensitive areas outside the 1.2km stretch of Medlow Bath village. These areas are directly impacted via changes to the natural water course flowing through Medlow Bath, light and noise pollution.
- Request for a further EIS for the impact on the upper Blue Mountains and the entire Blue Mountains freight corridor being expanded to cater for monster trucks.

Response

Refer to response in Section 4.2.1 Environment – EIS and Cumulative Impact.

5.3 Proposal justification

Issue description

In summary, the community group and individual respondents raised the following issues challenging the justification for the proposal:

- Medlow Bath duplication should not commence until the cost comparison of the 19km tunnel is presented to the community for consideration, the REF and associated costing for the Katoomba-Blackheath duplication is presented to the community for consultation and until current COVID restrictions are lifted allowing residents face to face consultation and more thorough explanation of what is being proposed.
- A duplicated highway through Medlow Bath still provides for only one route over the Blue Mountains negating any improvements in travel times especially as a result of accidents.
- This design will create a bottleneck at Medlow Bath, defeating the whole purpose of the upgrade.
- Transport continues to refute that a tunnel would be a more cost effective option for the Medlow Bath Great Western Highway upgrade, however Alistair Lunn himself acknowledges that Transport haven't completed any cost projections for this model.
- The expense and construction disruptions of these widening works will far outweigh the cost of a longer tunnel, starting at the termination of the dual carriageway at Katoomba and ending at the base of the Victoria Pass.
- Commission a feasibility study for the alternative 9km tunnel, or an (eastern) Medlow Bath bypass.
- Nine proposed options as bypasses for the Blue Mountains, including Gotthard and Eurostar rail tunnel models.
- The advantages of a 19km tunnel from Katoomba to Hartley
- Concerns about the impact of (potential) tunnelling on groundwater structures, endangered peat-swamp ecosystems and downstream that could affect the sandstone hydrogeology of the Blue Mountains.
- Request that the NSW and Federal Governments obtain an independent review of the proposed 19km tunnel from Katoomba to Hartley. Given the national and state significance of the Great Western Highway duplication, such a review would compare and evaluate the 19km tunnel with the proposed surface option between Katoomba and Blackheath, taking into consideration the economic, environmental and social impacts, during and post construction, on the NSW Central West and the Blue Mountains.
- No analysis of the independent report showing the environmental benefits to residents, our ecology and the freight industry of a longer tunnel from Katoomba to Blackheath either during or after the project period.

Response

Refer to response in Section 4.2.2 Design – Options for a Tunnel.

5.4 Design – Safety

Issue description

In summary, the community group and individual respondents raised the following issues:

- The Proposal will lead to increased vehicle movements, including extra-large 25-30 metre trucks
- Impacts on the general safety of the Medlow Bath community and amenity of residents.
- Shared Pedestrian/Cycle Path next to the highway means all users will be exposed to high levels of exhaust fumes as well as noise and vibration.
- It would be much safer and less distracting to have a single consistent speed limit for longer distances. A tunnel which rises slowly from Hartley or descends gently from Katoomba would provide a consistent 80kph for 19km.
- Both cyclists and pedestrians are against a shared pathway in close proximity to a four-lane highway. Long distance pathways are sited as far as possible away from highways or busy roads. Where the corridor is constrained, buffer zones of thick and deep vegetation mitigate the noise and fumes from the traffic and provide a more peaceful pathway albeit following the same route as the highway.
- The community would like to work closely with the relevant representatives of Transport to achieve the optimum benefit from the proposed Bike Track.
- There would be unsafe lanes @ 3.35 metres, where the standard is 3.5 metres, and unsafe shoulders @ 900mm, where the standard is 3 metres.

Response

As previously demonstrated in the Review of Environmental Factors, sections of the already upgraded Great Western Highway through the Lower Blue Mountains have realised a significant reduction in road trauma through provision of signalised intersections, pedestrian bridges, separate active transport facilities and improved alignment. Previously upgraded sections have realised approximately 77% reduction in fatalities and 28% reduction in crash rates overall.

Improving road safety for all users is primary project objective that has underpinned the design of the Medlow Bath Upgrade. This is a key motivation in the provision of a pedestrian bridge, removal of the railway level crossing, removal of the existing pedestrian refuge, widening of the pedestrian pathways, providing traffic barriers and maintaining speed compliance to 60km/hr through the section.

Transport have also committed through the Medlow Bath Upgrade to providing improvement works on Railway Parade to address safety issues on this important local road.

The design meets all applicable road design standards. The proposed lane widths maximise efficiency within the Proposal corridor to minimise impacts to adjacent properties and enable the incorporation of additional shared paths. The design lane widths allow for the safe movement of heavy vehicles along the highway as well as around corners.

It should be noted that Austroads guidelines (2009) provide a framework that promotes efficiency in design and construction, economy, consistency and safety for road users. The design team have carefully, diligently and to the fullest extent possible designed the Medlow Bath upgrade in line with the full suite of today's national, state and local design guidelines. Subsequent design and safety reviews have verified its compliance. The list of design standards applied were articulated in Section 3 of the Medlow Bath Review of Environmental Factors.

5.5 Design – Urban design and landscaping

Issue description

In summary, the community group and individual respondents raised the following issues:

- The design has no reference to the character of the village and its liveability.
- Planting themes in the villages of the Blue Mountains provide strong locational cues along the highway. Refer Urban Design Framework (2019) for the Katoomba to Mt Victoria duplication (UDF, 2019).
- The heritage item - 'Avenue of Trees' is central to the setting and heritage context of Medlow Bath.
- Concrete barriers beside the highway create ugliness, loss of large trees from the highway, increased noise and loss of 'mountains feel'.
- The REF before and after pictures of plantings are misleading; all replacements need careful planning by a local landscape designer.

Response

There were multiple comments received as part of the REF display that the proposed works did not consider the characteristics of Medlow Bath and that there was no consideration within its design.

Throughout the development of the design, landscape architects (Spackman Mossop Michaels) worked closely with the engineers, architects and environmental advisors to:

- develop an integrated design that considers the character of Medlow Bath and the Blue Mountains
- minimise impacts to the integrity of heritage sites, significant trees and cultural values of the community
- create a road corridor that responds to the natural and cultural environment, enhancing local and regional connectivity to evoke the underlying character of Medlow Bath and the Blue Mountains
- Apply the principles stipulated in Transport's urban design policies, procedures and design principles outlined in Transport urban design guiding document Beyond the Pavement and Around the Tracks

These were reviewed as part of an integrated design process and is documented in the Medlow Bath Urban Design, Landscape Character and Visual Impact Assessment Report (Spackman Mossop Michaels, October 2021). Section 6.9 of the REF summarised this report which has been updated to provide further details of the design and in particular further details of the design of pedestrian bridge and the planned modifications to the station. The latest version of the Urban Design, Landscape Character and Visual Impact Assessment Report has been included within Appendix 4.

The Urban Design, Landscape Character and Visual Impact Assessment Report followed a robust and well considered approach to design. This also includes liaising with urban designers from Transport and Blue Mountains City Council. Key aspects that were considered within the development of the design were:

- Landform
- Vegetation cover
- Built form and heritage
- Spatial quality
- Public domain
- Key activity areas
- Connectivity and access.

The outcomes from the above have identified opportunities for:

- The design of the proposed works in particular for the pedestrian bridge
- Integrated landscaping

The road, verge, share footpaths, way finding and the pedestrian bridge have been designed to reflect elements already existing in Medlow Bath and integrate into the village character and heritage items as much as possible, as well as providing additional functionality.

Specific examples are:

- The use of weathered steel on the bridge, which was inspired by the existing colours of the area including the power stanchions along the railway line.
- A mix of native vegetation and European influences which exists in Medlow Bath (eg from Hydro Majestic) has inspired the choice of plants for landscaping to include endemic vegetation as well as colourful exotics. The colours of this vegetation were chosen to complement the existing character of the town and trees have been used as visual or acoustic screens near residences.

An arborist assessment has been completed of the Avenue of Trees and other trees along the Great Western Highway – as summarised in Section 4.1. This assessment identified, that in addition to the Radiata Pines not being prevalent in the Avenue of Trees, a majority of the replacement Western Red Cedars were also affected by a degenerative disease with valid health concerns.

Regardless of the Highway upgrade proposal the long-term viability of the Avenue of Trees is in question. The Medlow Bath Upgrade landscape design aims to generate a new median tree feature that will respond to the intent of the original Avenue of Trees. This presents a long-term outcome that reinterprets and protects the long-term viability of the Avenue of Trees listing.

5.6 Design – Bellevue Crescent intersection (including alternate option)

Issue description

In summary, the community group and individual respondents raised the following issues:

- The alternative Bellevue Crescent option would remove most of the existing vegetation and all mature trees with significant built form and hard surfaces including increased traffic within proximity to residential properties.
- There has been no real assessment of the actual impact of light spill resulting from the alternative option.
- No consideration of privacy impacts to 17 Bellevue Crescent due to its proximity and orientation to the new Bellevue Crescent proposed alternative access.
- The alternative Bellevue Crescent alignment option reduces property acquisition.
- The alternative alignment would provide more access to Hydro Majestic and less traffic congestion entering the hotel.
- U-turn bay does not give a direct right turn access to move into the United Service Station or Hydro Majestic for traffic coming from Blackheath.
- Disagreement with ‘alternative option’ to the Bellevue Crescent U-turn and roundabout, allowing for the acquisition of Hydro and residential land, and the creation of a U-turn for semi-trailers and proposed pedestrian and station access overpass.

Response

The following scenarios for Belleview Crescent were provided within the REF:

	Concept Design	Alternate option
Option overview	Placing traffic lights and a U-turn bay at Bellevue Crescent to provide safer access to the Crescent, and allow for U-turning traffic to access the United Service Station and other properties on the eastern side of the Highway.	Relocating the Bellevue Crescent intersection to land next to the United Service Station, and through the Hydro Majestic land directly behind the service station. This option allows access to the United Service Station via the new connection, provides a connection to the Hydro Majestic, and allows traffic exiting the Hydro Majestic and the service station to turn east towards Katoomba without travelling on Bellevue Crescent. This option would reduce the need for vehicles exiting the Hydro Majestic to perform U-turns at Station Street and avoids the acquisition of one home in Bellevue Crescent.
Design sketch		

A value management exercise was completed to determine the best alignment for Bellevue Crescent. This assessment considered the design, associated assessments (notably traffic and transport assessment) and submissions received during the display of the REF.

Safety impacts to existing and future access, property impacts, and traffic flow and volumes have all been important considerations in examining these options.

The value management exercise determined that the concept design (incorporating the U-turn facility) is the best option. Even though an acquisition of a residential property is required it causes the least disturbance to the town while also providing the most advantages in road design.

The concept design option is the one that will be progressed into the final detailed design.

The findings of the value management exercise are summarised in the following table.

Differentiators	Concept Design	Alternate option	Option with best outcome
Safety	• Intersection sited on a natural crest which provides optimal location for visibility. • Proximity of the U-turn Bay to the intersection	• Located west of the crest • While compliant with design requirements the natural crest could obscure view of approaching cars	Concept: better visibility for drivers
Impacts to Existing Access	• Allows for U-turns from the east and west, i.e., Vehicles from Katoomba or from Blackheath can returns on their journey • Shorter access for properties to the immediate west of Bellevue Crescent (the highway fronting properties) • Similar access for the hydro majestic to the alternate option, with the exception of right turns out, which need to travel to Station Street to do a U-turn.	• U-turns would need to occur at the two private driveways (Hydro or Service station) or a roundabout could be added at the top of Bellevue for a single unit truck • Enhanced access to the service station for vehicles from the west and egress for vehicles returning to the east. • Better access for the Hydro Majestic. Provides a right turn out from the site.	Alternate: provides better access to petrol station and allows for option for alternative access to Hydro Majestic.
Impacts to future access	• Does not prevent future development of the Hydro Majestic that leads to additional traffic using Bellevue Crescent. • The U-turn Bay supports vehicles up to 19 metres.	• Assigns existing Bellevue Crescent to local traffic • Overflow parking may be more attracted to Bellevue Crescent	Concept: more flexibility in development of private property and U-turn Bay is purpose built to allow large vehicles to turn.

Property impacts	• one private property owner impacted. Owner appears to be a willing seller.	• Two commercial property owners impacted:
		  ○ Hydro Majestic opposed the option due to the impact on their lands and future development potential. Legal opposition noted and the position appeared to have council and community support.
		  ○ Service station and adjacent landowner felt that the Proposal would impact his development potential.
		• Three undeveloped Lots immediate east of the proposed intersection impacted
		• One residential property impacted by new road being built.
			Concept: less properties are impacted and landowners associated with the alternate option were generally opposed to it.

Traffic flow	• This option is more efficient, with a small delay only at the new Bellevue Crescent intersection. The right turn in and left turn out work together efficiently and the right turn out demand is low (only traffic from Bellevue Crescent, Delmonte Avenue and u-turning traffic).	• Attracts development traffic (i.e. service station and Hydro Majestic) as well as local traffic for Bellevue Crescent and Delmonte Avenue in addition to u-turning traffic. This creates more impact on the operation of the highway.	Concept: The intersection is more efficient and the U-turn facility provides better functionality for the adjoining construction works.

Differentiators	Concept Design	Alternate option	Option with best outcome
	• With the eastern section duplication, Foy Avenue traffic would need to use the U-turn facility at Bellevue Crescent.	• With the eastern section duplication, Foy Avenue traffic would need to either continue to Station Street and make a U-turn or make a turn at the new connection road, using the Bellevue Crescent cul de sac	
Traffic volumes	• Vehicles accessing the hydro-majestic would use the proposed filter right turn. This option largely remains the same	• Due to the provision of the right turn out, this option removes u-turning traffic from the Hydro Majestic that currently turns at Station Street.	Concept: The use of the U-turn facility enables vehicles to queue away from other facilities. The alternate option could lead to vehicles (including trucks) to queue at the entrance to the petrol station
Noise	• Noise level similar to existing. Highway is still the dominant noise source for most receivers.	• Additional new sensitive receivers created at the western end of Bellevue Crescent due to the reassignment of local traffic, especially those heading to Delmonte Avenue. • Heavy vehicle compression breaking would be greater that the alternate option with the signals located just beyond the crest in the westbound direction.	Concept: Less number of residents impacted by noise that for Alternate.
Gateway	• This site signifies entry into the town earlier, which helps with the perception and actual concerns re speed and safety through the township.	• Places an intersection towards the midpoint of the town which could be a distraction.	Concept: being at the entry point to the town, it causes less impact to the other areas nearer to the Hydro Majestic.
Community and Stakeholder feedback	• More support for this option, especially where the alternate options was seen as potentially impacting the Hydro Majestic	• There was some support for this option as was seen to prevent vehicles from turning into the existing Bellevue Crescent. Connections with petrol station and potential Hydro Majestic access were also seen to be positive.	Concept: Even though there were benefits of the alternate option, the stakeholder feedback was more aligned for the concept design as the preferred.

5.7 Design – Pedestrian bridge

Issue description

In summary, the community group and individual respondents raised the following issues:

- The design of the bridge is visually intrusive to the streetscape in every direction. Colours are harsh and stainless-steel mesh will feel like a gaol. Inappropriate for a small village.
- The availability of Opal Card data from both the local buses and Train service clearly show there is no need for an overbridge with four lifts and staircases. The current at grade pedestrian level crossing and refuge island is completely satisfactory.
- Bridge should be protective to commuters waiting in the winter cold, rain, and snow.
- Recommendation for canopy cover at bus stops and bridges where lifts are located. This would shelter commuters from weather events.
- Access could be at the northern end of the station with one lift or redesign current ramp to improve access and safety.
- Much as the community supports the improved safety and the provision of facilities to assist people with disability, the design and structure of the bridge, lifts and stairways will negatively overwhelm the village, the heritage-listed Railway Station and the Hydro Majestic Hotel.
- Some of the suggested alternatives for improved access:
    - Improving access to the existing pedestrian bridge
    - Providing accessible parking places at the northern end of Railway Parade
    - Developing more compatible bridge designs that will reduce the impact on the village and the Railway Station
    - Build a pedestrian tunnel under the highway with lighting, CCTV and ramp access

Response

The Traffic and Transport Assessment appendix of the REF included pedestrian modelling of the station and bridge. This analysis was completed to inform acceptable station infrastructure sizing for forecast passenger demands. A Fruin analysis was undertaken for 2036 peak hour periods using static pedestrian modelling.

Further information on the need for a pedestrian bridge is available in Section 4.2.3.

An options report presenting the options considerations that lead to the selection and design of the pedestrian bridge is provided in Appendix 5.

The report details the role heritage, visual impact and accessibility requirements played in developing the design. In addition, lighting for the bridge has been considered to minimise its visual impact – refer to Appendix 6 for further information on the lighting design.

The proposed solution needs to improve safety for pedestrians, while minimising impact to the flow of vehicle traffic on the highway within an urban village centre where elements connect directly with Medlow Bath Railway Station and the key tourist destinations surrounding it. The bridge is provided to accommodate desire lines in both current and future states, while addressing known safety issues and accessibility deficiencies.

The design of the bridge was developed in co-ordination of engineers, landscape architects and heritage consultants to balance functionality with an appearance that reflects elements already existing

in Medlow Bath recognising the village character and heritage items as much as possible. In addition, compliance aspects including Disability Discrimination Act (DDA) and lighting were also incorporated into the design. The removal of a consolidated roof or cover from the bridge was balanced with the need to reduce the visual dominance. Pedestrian refuges and awnings associated with the lifts provide for protection in inclement weather.

Following our ongoing engagement with Heritage NSW and Blue Mountains City Council, the bridge design and station precinct is continuing to progress through a series of design challenge workshops to improve its fit with the surrounding heritage context.

Heritage and architectural specialists will be working with key stakeholders to develop the heritage experience between Medlow Bath Station and the Hydro Majestic in a manner that draws in local context and character. This will be required as part of the Section 60 Heritage Approval process.

Further community information sessions will be held as the design matures, to engage the community on progress made.

5.8 Design - Bus shelter

Issue description

In summary, the community group and individual respondents raised the following issues:

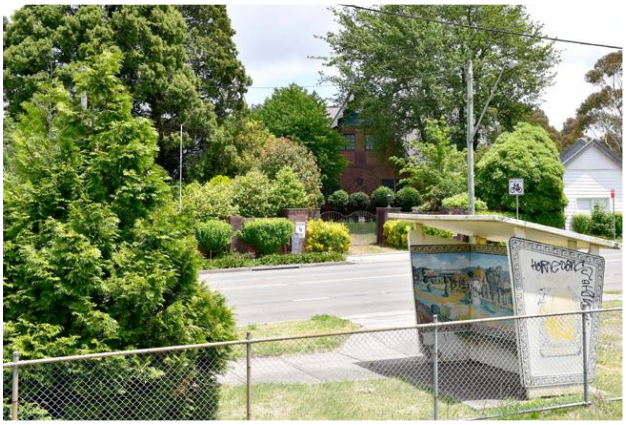
- Endorse the plan for the bus shelters to remain with restoration of the heritage mural of the Hydro Majestic hotel.
- The shelter is an important tourist and community feature in the village. If it needs to be moved, it must be carefully stored, rebuilt and the murals fully restored
- Medlow Bath Residents Association (MBRA) must be consulted as to the final location and orientation of the bus shelter.
- Bus shelters at the bus stop should also be protective to commuters waiting in the winter cold, rain, and snow.
- A look at incorporating local Aboriginal artwork on the bridge and bus shelters would be a nice addition.
- Potential safety concerns were raised if school kids were dropped off at the bus stop on the Great Western Highway.

Response

Feedback during the REF consultation raised potential safety concerns of younger children being dropped off at the bus stop on the Great Western Highway and noting the improved safety of younger kinder aged children using the Railway Parade bus stop.

In response to the concerns raised, Transport have modified the design to include relocation of the existing concrete bus shelter with painted heritage mural from the east bound side of the Great Western Highway to Railway Parade.

Transport will provide modern bus shelters on the east and west bound sides of the highway to improve accessibility and service for all highway-based bus services.



5.9 Design - Lighting

Issue description

In summary, the community group and individual respondents raised the following issues:

- There is no lighting plan in the REF.
- All the residents along the highway from Foy Avenue to Station Street, including the Hydro Majestic Hotel and Railway Parade to Coachhouse Lane will be impacted by brighter and taller highway/street lighting.
- The design ignores Blue Mountains strategy to reduce light pollution.
- Recommendation for LED lights that do not emit significant light pollution.

Response

The lighting for the highway, station upgrade and new pedestrian bridge has been further developed since the REF was displayed. The design aims to minimise light pollution to retain the village feel of Medlow Bath while still meeting the required lighting standards supporting safety and amenity. Appendix 6 details the lighting design and is summarised as follows:

The upgrade of roadway lighting on the Great Western Highway is adopting the lowest possible lighting levels, suited to rural village locations. Lighting would be designed and implemented with LED lighting to orientate lighting directly where it needs to minimise light spill and glare impacts on nearby receivers. A lower colour temperature light fitting is also proposed to reduce the impact that high intensity white light can create in areas like Medlow Bath.

It is expected that light spill would be mostly confined within the operational footprint. Temporary and permanent lighting would be designed and implemented with consideration of the need to orientate lighting to minimise light spill and glare impacts on nearby residents. The lights on the station and pedestrian bridge will also incorporate an innovative motion-controlled lighting reduction strategy, where some lit areas will be motion activated or reduced during off peak periods.

<u>Lighting for road corridor</u>

Road lighting has been designed in compliance with AS/ZNS 1158: *Lighting for roads and public spaces.* The engineers and landscape architect co-ordinated the specification of the lighting to meet functionality and to be in keeping with the existing streetscape.

Typically, highways and main roads need to be V3 standards (as per AS/ZNS 1158). In recognition of the sensitivity of Medlow Bath, the V5 standard was used as it would limit light spill and provide a balance of safety and security.

The design approach considered:

- Provision of consistent levels of illumination on the carriageway while minimising light spill
- Compatibility with existing lighting at the northern end of the upgrade
- Achieve acceptable lighting levels for security around bus stops, car parks and kiss and ride areas
- Compatibility with lighting proposals planned for the pedestrian bridge
- Reuse of existing equipment where possible
- Space constraints within the road cross section

The luminaire is to be an 80w RoadLED Midi Aeroscreen mounted at 9m mounting height.

It is expected that there would be a consistent approach to lighting across the whole Great Western Highway Upgrade Program, creating in a positive driving experience through the different towns.

Lighting for station and pedestrian bridge

Lighting on the station would include the retrofitting of the existing poles will LED bulbs to maintain heritage values. Additional LED lighting would be installed on custom steel structures on the platform and batten luminaires on the underside of the platform building awnings.

The lights on the new pedestrian bridge would incorporate an innovative lighting control strategy. This design would dim the lighting on the footbridge during the times when there are no users. Motion detectors have been specified at the lift entrances and the stairs leading on and off the footbridge. This innovation will reduce the visual impact of the bridge at night and reduce energy use. The lighting engineers have developed this to ensure that safety would not been compromised when the bridge (including lifts) is in use.

5.10 Design – Parking

Issue description

In summary, the community group and individual respondents raised the following issues:

- The increase in light vehicles with the loss of public car parking has the potential to adversely impact on the existing amenity of the Hydro Majestic as members of the public will seek to utilise Hydro Majestic's private car parking facilities.
- There are over 90 parking spots used by tourists every day that will need to be replaced when the strip in front of the Hydro Majestic is lost.
- Additional parking needed to account the removed parking spaces.
- The Motorcycle Council of NSW requests that motorcycle and scooter parking be provided in the proposed commuter car park. The recently revised Australian Standard AS 2890.5:2020

On-street Parking provides information on the size and other requirements for motorcycle and scooter parking.

- Request to consider an additional kiss and ride parking spot on the Great Western Highway to allow a quick car park pick-up from the bus stop in the event it is raining. E.g., single spot after the bus pull-out zone.
- Concerns were raised regarding limited parking for Tournament Café users.

Response

The Traffic and Transport Assessment (within the REF) noted that the Proposal would result in the following parking impacts:

- The commuter car park at Railway Parade would be formalised to include 9 parking bays to accommodate commuters currently parking on the highway
- Two kiss and ride bays would be provided at Railway Parade
- The loss of around 39 public car parking spaces along the western side of the Great Western Highway

The loss of parking outside the Hydro Majestic has been previously accounted for by the existing Development Consent for the property. This was previously accounted for within the Development Consent and Transport confirms that Blue Mountains City Council, through a development assessment process, formally advised Hydro Majestic in 2010 that parking on the Highway could not be relied upon or assessed as that land was reserved for future widening of the highway.

Transport appreciates that on-street parking will be removed from the Highway adjacent to the Hydro Majestic however does not accept that 90 spaces are required to be replaced for the use of the Hydro Majestic Development. Blue Mountain City Council's own Citywide Parking Strategic Plan 2018 identifies 39 parking spaces on the Great Western Highway.

Transport is committed to working with both Blue Mountains City Council and the Hydro Majestic to better appreciate the parking demands of this iconic development, while considering ways to reduce the impact that widening construction and future operation of the highway may have on this development.

The formalisation of parking in Railway Parade seeks to offset the percentage of this public parking on the highway that is currently being used by rail commuters. The REF identified that parking on Railway Parade would be formalised and expanded to include eight parking bays and include one accessible parking space. Traffic surveys to date have not indicated demand for motorcycle parking spaces.

Transport is continuing to work with Blue Mountains City Council to consider ways to further improve and better define public parking areas in Medlow Bath to prevent overflow parking in local streets during the special events that increase parking demand.

Following further discussions with BMCC on public parking options, TfNSW is now also committed to formalising an additional 13 spaces along the roadside frontage of Medlow Park..

5.11 Landscape character and visual amenity

Issue description

In summary, the community group and individual respondents raised the following issues:

- Removal of large mature trees option would represent a significant visual intrusion into the landscape setting and would have a devastating impact on the amenity of nearby residential properties.
- Widening of the highway will lead to a loss of trees and impact the Avenue of Trees
- Lighting poles should not clutter the streetscape. Bronze coloured poles are recommended to blend in with the streetscape.
- Recommendation for introducing Aboriginal art on the bridge and bus shelters.

Response

Removal of Vegetation

As seen from the landscaping plans included in the REF, a significant amount of vegetation would be introduced into the project including into the central median. This vegetation has been designed by a landscape architect who aimed to provide a well-vegetated gateway into Medlow Bath that integrates the roadway and pedestrian bridge structure with their surrounding landscape and provides motorists, as well as cyclists and pedestrians, with a 'sense of place'. In doing so. A delicate balance between screening of the proposed pedestrian bridge and widened carriageway from sensitive viewing locations and maintaining key vistas from the Great Western Highway over the Megalong Valley is needed.

These plantings and revegetation have considered native vegetation and colourful exotics to complement the existing character of Medlow Bath.

To ensure that the vegetation would be established, maintenance requirements would be added to the contractor's scope so that they manage and maintain these areas for at least twelve months after the project is completed.

An arborist assessment has been completed of the Avenue of Trees and other trees along the Great Western Highway – as summarised in Section 4.1. This assessment identified that in addition to the Radiata Pines no longer being prevalent in the Avenue of Trees that a majority of the replacement Western Red Cedars were also found to be suffering a degenerative disease.

Lighting Design

Specifically, road lighting has been designed in compliance with AS/ZNS 1158: *Lighting for roads and public spaces.* The engineers and landscape architect co-ordinated the specification of the lighting to meet functionality while in keeping with the streetscape through reducing the number of lighting columns.

Illuminance and light spill would be minor and would be confined within the operational footprint. Temporary and permanent lighting would be designed and implemented with consideration of the need to orientate lighting to minimise light spill and glare impacts on nearby receivers.

Cultural Interpretation on Transport Infrastructure

Consideration of artwork representing Aboriginal and Non-Aboriginal heritage will be integrated into the broader cultural heritage design and heritage interpretation strategy for the overall Great Western Highway Katoomba to Lithgow Upgrade Program.

5.12 Noise and vibration impact

Issue description

In summary, the community group and individual respondents raised the following issues:

- REF fails to show how noise and light emissions are to be addressed during roadworks phase.
- Before commencing works, noise and vibration must be identified and addressed, particularly for residents most exposed, such as Railway Parade and Bellevue Crescent.
- Apart from COVID lockdowns, the volume of traffic traversing the Great Western Highway is increasing yearly. Without Government encouragement, freight transporters will choose the Great Western Highway in preference to freight on rail. There will, therefore, be more noise, more vibration and more exhaust fumes from traffic on the proposed four lanes of highway through Medlow. The noise, vibrations and exhaust fumes will be right in front of guests staying at the Hydro Majestic Hotel and right beside pedestrians and cyclists using the shared pathway.
- Noise modelling was not completed to industry standards.

Response

Noise and vibration during construction

A detailed noise and vibration assessment was completed for the REF which comprehensively assessed the potential impacts of the project during construction and operation.

During the construction phase, the following was identified within the assessment:

- Noise intensive works (such as concrete cutting and heavy rock breaking) would be required and could cause short term nuisance. These activities will be scheduled during standard construction hours but, if not practical, scheduled as early as possible during the evening and night-time periods. Impacted parties would be offered respite options.
- Several vibration sensitive receivers have been identified (notably the stone wall of the Hydro Majestic) which would require careful consideration when planning works and, dependent on the nature of the works, may require vibration monitoring throughout the project.

Impacts to sensitive receivers (people and assets) will be carefully managed. A construction noise and vibration management plan would be written to carefully consider any and all appropriate management and mitigation measures to control the impacts. This would be written before the construction works begin and include additional stakeholder engagement.

Noise during operation

Modelling within the noise and vibration assessment identified 13 properties (located on Station Street, Great Western Highway and Delmonte Avenue) that are eligible for architectural treatment due to elevated noise levels from the road.

Further receiver specific acoustic assessments are required for these properties, which would then identify which architectural treatments (e.g., insulation, air-conditioning, double-glazed windows etc) would be most appropriate to mitigate noise. This be completed as part of the contractors work or commenced by the project team prior to construction commencing. This work will be conducted by negation with affected property owners and informed by professional acoustic engineers to determine suitable and effective means specific to each property.

Additional Screening

As part of the design, vegetation is being used as a visual and acoustic screen. This is prevalent around the station with tall trees being used.

Additional planting on Railway Parade is also being completed as part of a “Community Planting Scheme”. This is a partnership between the Medlow Bath Residents Association (MBRA) and a local professional landscape company.

Noise modelling

Some responses requested clarification on the noise modelling that was completed as part of the REF. Noise assessments included and displayed as part of the REF are consistent with relevant industry standards. The following provides further information:

Issue Raised	Additional Information
Recording devices: 3 of the 4 recording devices were CLASS 2, not Class 1	The EPAs Noise Policy for Industry (NPfI) identifies that either Class 1 or Class 2 is suitable for the measurement of environmental noise.
Road noise measured traffic at 60kph, no speeding, stopping or accelerating	Road noise levels have been measured in accordance with the Road Noise Policy and predicted in accordance with the Calculation of Road Traffic Noise (CoRTN). The LAeq(15hour) and LAeq(9hour) noise is averaged over the daytime and night-time periods. These noise levels are controlled by free-flowing traffic which stopping and starting events have very little impact over.
Receivers should be at 0.5m, 1.5m, and 3.6m above ground but were only at 1.5m	These heights are the required assessment heights for tyres, heavy vehicle engines, and heavy vehicle exhausts. They are not associated with receivers. The assessment has included the three-source height, including these referenced heights, in all road traffic noise modelling. Receiver heights have been correctly assessed as 1.5 m above ground.
No monitoring of sound at the bridge but was extrapolated from 104 GWH instead of measuring stopping and acceleration noise accurately in Station Street.	The bridge does not have any specific features which would increase noise such as significant expansion joints or a steel structure.
Placement of measuring devices did not follow EPA guidelines.	The noise logging was completed in accordance with the EPAs Noise Policy for Industry.
Measurements were affected by fences, vegetation, railway infrastructure and positioning lower than the surface of the road	A road traffic noise model was built including the concurrent measured road traffic flows and all major noise influencing structures. The noise model was shown to calibrate effectively against the measured noise levels, proving that the dominant noise source is the Great Western Highway, and the noise

Issue Raised	Additional Information
	logging locations were suitable and not suitably impacted by surrounding structures.
EPA advises to avoid taking measurements when raining or windy	Weather affected data was excluded from the measurements
Some results showed noise levels equivalent to jackhammering, a rock concert and even a jet aircraft taking off	High noise levels can be predicted when the noise levels are directly adjacent to the noise source. Construction noise is predicted unmitigated to show a worst-case scenario.
This UTURN (at Bellevue Crescent) is 24hrs with no curfew. The impact on all houses in Bellevue Crescent and Delmonte Avenue and on the GWH, as well as in Station St and Railway Pde has not been acknowledged.	Noise levels for the U-Turn Bay have been predicted in Section 5.6 of the technical paper. Source levels, slightly lower than those mentioned above are included, with a reference. These levels include octave band frequency noise data, including a breakdown of rolling and propulsion noise. Predicted noise levels have been assessed against the Road Noise Policy noise criteria and found to be compliant.

5.13 Traffic and transport

Issue description

In summary, the community group and individual respondents raised the following issues:

- The proposed solution will not shorten the journey from the Central West, due to two sets of traffic lights, a 60kms speed zone, and what will become another bottle neck on the Highway during weekends.
- The traffic lane widths at the Hydro Majestic Bar are too narrow to safely accommodate large trucks. Two trucks travelling side by side along this section will lose their side mirrors, and will have no place to pull over, as they are required to do under these circumstances.
- Medlow Bath will remain a major traffic bottle neck for at least two years and then that will be followed by congestion caused by construction on either side of Medlow Bath; eight years minimum.
- Concerns traffic signals would not be synced properly, causing traffic congestion.
- Signage is needed for No Right Turns and U-Turns, including instructions on the signs for U-Turns.

Response

Efficiency of duplication

The Traffic and Transport Assessment included within the REF identified that the Proposal would improve the existing performance of the highway, including accommodating projected future increases to traffic volumes in 2036. The assessment also identified that alterations to the existing alignment, particularly the signalised control system and U-turn Bay at Bellevue Crescent and the addition of right turn bays eastbound into key amenities, would improve the safety of vehicles and the community.

While access and traffic movement will be maintained through construction, there will be short term impacts while traffic is manoeuvred through construction sites. Traffic signalling and signage will be implanted to maximise the efficiency of the upgrades works.

Traffic

Modelling and traffic volume studies show that Great Western Highway traffic will continue to grow into the future in line with increased traffic demand and growth, independent of the highway upgrade. The Medlow Bath traffic and transport assessment identified the future volumes, vehicle type growth and operational performance of the highway with and without the Medlow Bath Upgrade Proposal. This assessment projected improved performance with four lanes.

Lane widths

The lanes widths indicated in the REF maximise efficiency within the project corridor to minimise impacts to neighbouring properties and enable the incorporation of additional shared paths. The design provided the required lane widths to meet standards. These lane widths allow for the safe movement of heavy vehicles along the highway as well as around corners at the maintained speed limit of 60km/hr.

5.14 Socio-economic impact

Issue description

In summary, the community group and individual respondents raised the following issues:

- Demolishing the community funded Elsie Langford Centre. Transport needs to offer financial compensation.
- To create a sanitised suburban-like environment which looks just like what visitors from Sydney have tried to escape, will not contribute anything to the development of tourism or add anything positive to the local residential amenity.
- The Proposal will permanently decrease the value of local resident's properties in Railway Pde and Bellevue Crescent.

Response

Elsie Langford Centre

Blue Mountains City Council prepared the Medlow Park Plan of Management (2013) determine the future use of the parcel at 16-18 Railway Parade, which includes the Elsie Langford Centre. The document identified the building as "small, damaged and not fit to be a public building in its current state". It also stated that the Elsie Langford Centre may be demolished if it is to be replaced, if it becomes unfeasible to re-open or if no use and funding has been found by 2020".

Transport appreciate that Elsie Langford was a significant local person in the development of Medlow Bath and in discussion with the Langford family would look at opportunities for a memorial elsewhere in the town as part of the works.

Transport is committed to offsetting the impact to the Elsie Langford Centre by working with Blue Mountains City Council through funding further water quality improvement works downstream existing rock channel in Medlow Park that will help to further mitigate erosion. This is proposed to be both a compensatory offset for the removal of the Elsie Langford Centre (in line with Councils Plan of Management) and a "value add" to the proposed water quality control system, to provide additional treatment through to downstream receiving systems beyond Medlow Park.

Economic Impacts

A socio-economic assessment was completed as part of the REF. This assessment stated that:

- "Given the relatively few businesses within the project corridor, the anticipated negative impacts from construction are expected to be minimal."
- "Over the long term, during the operational period the area is expected to marginally benefit in terms of improved access and connectivity. The area may also experience some indirect benefits from the project overall as the traffic improves generally and the area becomes a more attractive destination."

In addition some submissions suggested that local accommodation in the town (e.g. bed and breakfasts and cafes) would lose revenue. During construction activities, it is expected that the demand for mid-week accommodation will increase. Transport would partner with these providers to encourage the use of local accommodation facilities for worker accommodation. This will also extend to providers of local cafes and restaurants as Transport encourages support of local business through construction. An increased workforce demand during construction would also generate additional customers.

It is anticipated that any impact to property value during construction, due to disturbance would be short term in nature, as values typically show rise after project completion in line with the increase in accessibility to the area.

Transport is committed to working with local businesses during construction to ease the potential economic impacts on the area. This includes limiting work on weekends where possible and developing staging plans that maximise construction work during standard working hours.

5.15 Water quality and hydrology

Issue description

In summary, the community group and individual respondents raised the following issues:

- The REF must include all environmentally sensitive areas likely to be affected by the project, particularly water catchment areas.
  Water Quality & Groundwater
- The Elsie Langford Centre (ELC) in Railway Pde will be demolished and a large filtration basin & gross pollutant trap be built there with overflows to Medlow Park rock lined creek. There will be much greater water runoff from a 4-lane tarmacked road to a drain which already overflows to Medlow Park rock lined creek.
- Increased paved surfaces could alter groundwater recharge rates, impacts to residences and fragile ecosystems such as ecologically endangered Blue Mountains Swamps.
- Concerns of stormwater pollution and increased peak flows from the Great Western Highway on downstream watercourses and peat-swamps that could cause erosion and channelization of watercourses, peat-swamps and associated species.

Response

Refer to response in Section 4.2.8 - Surface water quality and hydrology

5.16 Heritage- Non-Aboriginal

Issue description

In summary, the community group and individual respondents raised the following issues:

- The bus shelter is an important tourist and community feature in the village. If it needs to be moved, it must be carefully stored, rebuilt and the murals fully restored.
- The bus shelter will be moved. Medlow Bath deserves to keep elements such as this which define our urban and cultural heritage
- The bus shelter must be preserved and replicated with a different mural on the other side of the road. Residents must be consulted on this and the heritage mural must be preserved and at the expense of Transport.
- The railway station and associated buildings are heritage listed and must not be dominated by an ugly construction such as the planned pedestrian bridge, lifts and stairs.
- The brass plaques adjacent to many of the trees and in memory of deceased people with HIV/Aids need preserving.
- Impact on the heritage listed Hydro Majestic and its curtilage
- Avenue of Trees preservation.

Response

Refer to response in Section 4.2.5 - Non-Aboriginal heritage.

There is no work proposed within Medlow Park, however Transport is also committed to assuring no damage occurs to brass plaques in the park as a result of the proposal.

<u>Bus shelter</u>

Feedback during the REF consultation raised potential safety concerns for younger children being dropped off at the bus stop on the Great Western Highway and noting the improved safety of younger kinder aged children using the Railway Parade bus stop.

In response to the concerns raised with heritage and the safety benefits the community observe with the Railway Parade bus stop, Transport have modified the design to relocate the existing concrete bus shelter with painted heritage mural from the east bound side of the Great Western Highway to Railway Parade.

The potential heritage aspects of the mural contained within the shelter will be retained in Medlow Bath by relocating the shelter to Railway Parade.

New bus shelters will be provided on the highway for both east and west bound travel.

5.17 Heritage – Aboriginal

Issue description

In summary, the community group and individual respondents raised the following issues:

- There has not been an extensive investigation of potential aboriginal artefacts on either side of the Great Western Highway.
- The discovery of 3000 aboriginal artefacts in the investigation work between Mount Victoria and Hartley is a clear indication that the REF has been completely inadequate in identifying the likely wealth of indigenous heritage likely to be demolished in sections without an EIS.

Response

Studies informing the REF found that no known Aboriginal sites were identified within the proposal study area. Further heritage impacts across the Great Western Highway upgrade program are being assessed by the environmental assessments capturing those areas of the proposed upgrade program.

In Medlow Bath, the proposal area has undergone extensive landscape modification experiencing a high level of disturbance from previous transport development which has been documented as part of previous Aboriginal heritage investigations (Jacobs, 2020).

The assessment found there is a low likelihood that the Proposal would impact any previously unidentified culturally sensitive items.

Transport has investigated the corridor for items of Aboriginal cultural heritage or significance, and as documented in the REF, there are no known Aboriginal sites identified within the proposal area.

The Mount Victoria to Hartley Valley section of the highway upgrade is outside the scope of the Medlow Bath Upgrade and will be considered through an environmental assessment of that section of the proposed highway upgrade.

The proposal area at Medlow Bath has undergone extensive landscape modification and high level of disturbance from previous transport and other development. This has been documented as part of previous Aboriginal heritage investigations (Jacobs, 2020).

In the event of Aboriginal artefacts being uncovered during construction, the Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime Services, 2015) would be followed.

5.18 Biodiversity

Issue description

In summary, the community group and individual respondents raised the following issues:

- The proposal is located in a buffer zone of the GBMA World Heritage property, protected under the EPBC and so, impacts of both construction and the road use itself needs to be assessed in accordance the EPBC Act.
- Total Katoomba – Medlow Bath – Blackheath highway upgrade means much greater potential impacts on water and water catchments, threatened species, ecological communities, wildlife habitat and areas of outstanding biodiversity values. Consider Katoomba to Blackheath as a whole.

Response

Refer to response in Section 4.2.9 - Biodiversity

5.19 Air quality

Issue description

In summary, the community group and individual respondents raised the following issues:

- Concerns regarding the increased traffic from a dual highway, resulting in increased noise, and impacts to air quality.
- Shared pedestrian/cycle path near the highway means users will be exposed to high levels of exhaust fumes.

Response

Regardless of upgrade modelling and traffic volume studies show that Great Western Highway traffic will continue to grow into the future in line with increased traffic demand and growth.

Catering for both observed and projected vehicle growth over time, modelling has identified that duplication of the highway will enable traffic to flow more efficiently. This will mean less stop start traffic generating a modelled improvement in air quality more broadly.

The Proposal area would be also restored with improved landscaping which will provide acoustic screens and locally improve air quality over the existing conditions experienced along the corridor length which has experienced the continuing removal of mature trees due to storm damage.

Due to improved traffic conditions minor long-term benefits to air quality are projected to occur.

5.20 Property acquisition

Issue description

In summary, the community group and individual respondents raised the following issues:

- If Transport put a bit more thought into the design, there would be no need for property acquisition (Bellevue Crescent).
- Don't feel the removal of the Elise Langford Centre for the placement of a water basin is a good use of local public lands.
- Disagreement with the Proposal including 'alternative option' to the Bellevue Crescent U-turn and roundabout, allowing for the acquisition of Hydro and Residential land.
- I would prefer no acquisitions of homes of full-time residents if possible.

Response

Some property acquisition is necessary to upgrade the intersection, provide for landing of the pedestrian bridge and to provide space for the water quality basin. The alternate Bellevue Crescent option will not proceed.

Any property acquisition would be undertaken in accordance with the provisions of the NSW *Property Acquisition (Just Terms Compensation) Act 1991*.

Transport has commenced consultation with potentially affected property owners and would continue to engage with them through the detailed design phase about specific property impacts, including the acquisition process.

5.21 Construction

Issue description

In summary, the community group and individual respondents raised the following issues:

- Transport has not provided mitigation for construction or operation along Railway Parade or Bellevue Crescent.
- No mention of compensation expected significant impacts on residences close to highway during construction phase.

Response

Measures to avoid, minimise or offset potential environmental impacts have been considered during the options process and development of the concept design, and have continued through the detailed design phase.

Compensation is not provided as means to mitigate potential impacts. The mitigation measures proposed to reduce and manage impacts of The Proposal are described in the REF and updated in section 0 of this document.

Construction activities would be guided by a Construction Environmental Management Plan (CEMP) to ensure work is carried out to Transport specifications (published by the former Roads and Maritime)

within the specified work area. The final construction plan and methods chosen by the contractor would also be required to be consistent with this framework.

Potential impacts to be mitigated would include:

- Traffic would be managed during the construction works to minimise disruption to road users. A traffic management plan would form part of the CEMP.
- Auxiliary sites (site compounds) would include allocation of worker parking on site. In addition, it is intended that workers would walk to their required locations where suitable. An auxiliary facilities management plan would form part of the CEMP.
- Noise disturbance activities (in particular during out of hours works) would be mitigated as far as possible with the installation of temporary acoustic screens, consultation and limited in duration and frequency to provide respite to residential receivers.

Impacts during construction will be minimised by implementing the CEMP and no compensation will be paid to community members.

5.22 Operation

Issue description

In summary, the community group and individual respondents raised the following issues:

- Transport has not provided mitigation for construction or operation along Railway Parade or Bellevue Crescent.
- Transport has not provided design or proposals to show how noise, light and emissions are to be addressed during and after the roadworks are completed.

Response

The REF identifies required mitigation associated with the Proposal including the surrounding Medlow Bath environment. Updated lighting and noise information is provided in sections 5.9 and 5.12 respectively.

5.23 Out of scope

Issue description

In summary, the community group and individual respondents raised the following issues:

- Improvement of Bells Line of Road.
- Rail works are preferred due to freight truck traffic.
- Alternative route to the Great Western Highway through the Blue Mountains needed to alleviate traffic incident management.
- Rail options (Penrith- Bathurst stage of the Western Fast Train and the Blue Mountains Vehicle Shuttle) should be prioritised over an inefficient road by-pass.

Response

The comments listed above are noted, however, are outside the scope of this Proposal and therefore, have not been considered any further.

6. Additional environmental assessment

Additional environmental assessments have completed since the REF was finalised for display (July 2021), to assist with the design of the duplication project. These assessments are:

- Arborist assessment.
- Updated Visual Impact Assessment.
- Preferred Design Report - Bellevue Crescent Intersection Options.
- Pedestrian Bridge Option Report
- Detailed SoHI for Medlow Bath Station and Bridge.
- Updated Water Quality Assessment

Each of these are summarised in the following sections.

6.1 Arborist Assessment

The requirement of an Arboricultural Impact Assessment was identified in the REF to assess potential impacts of tree clearing within the heritage curtilage of Hydro Majestic, Avenue of Trees or Medlow Bath Hydro Majestic original walking track complex.

6.1.1 Methodology

The assessment approach is discussed below, and the assessment was conducted in accordance with International Society of Arboriculture.

- Site inspections were conducted on 1, 15 and 25 June 2021 to record details of tree species, dimensions, brief assessment (history, structure, pest, disease or any other variables subject to the tree), significance, allocation of the zones of protection (ie, Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for each tree that are greater than four metres in height and the stem is greater than 100 millimetres in diameter at breast height).
- The areas of assessment were split into respective areas and the trees relative to the Proposal were assigned numbers for identification.
- Proposal documents (concept design and Landscape Character and Visual Impact Assessment Report) were reviewed to identify potential impacts of the Proposal.
- Recommendations to protect the trees identified for retention are provided.

6.1.2 Existing environment

The area of assessment comprises a portion of the Great Western Highway, between Bellevue Crescent and the bridge crossing the rail, being Railway Parade. Extending on the northeastern side of the highway is the rail corridor, and the south-western side are private lots, including the Hydro Majestic Motel, which consumes the majority of this area.

The trees throughout the area of assessment are dominated by two species which are the Monterey Pine and Western Red Cedar. The Mountain Spotted Gum and London Plane follow up with a lesser number. These four species are predominately contained within the road corridor of the Highway.

Eighty trees have been identified in the area of assessment which are located within or adjacent to the area of works. Further details about tree species and their present form are briefly described below. The location of key trees identified during the assessment are illustrated in Figure 6.1 to Figure 6.5 (note that these are not to scale).

Figure 6.1: Plan 1, area of assessment illustrating tree location

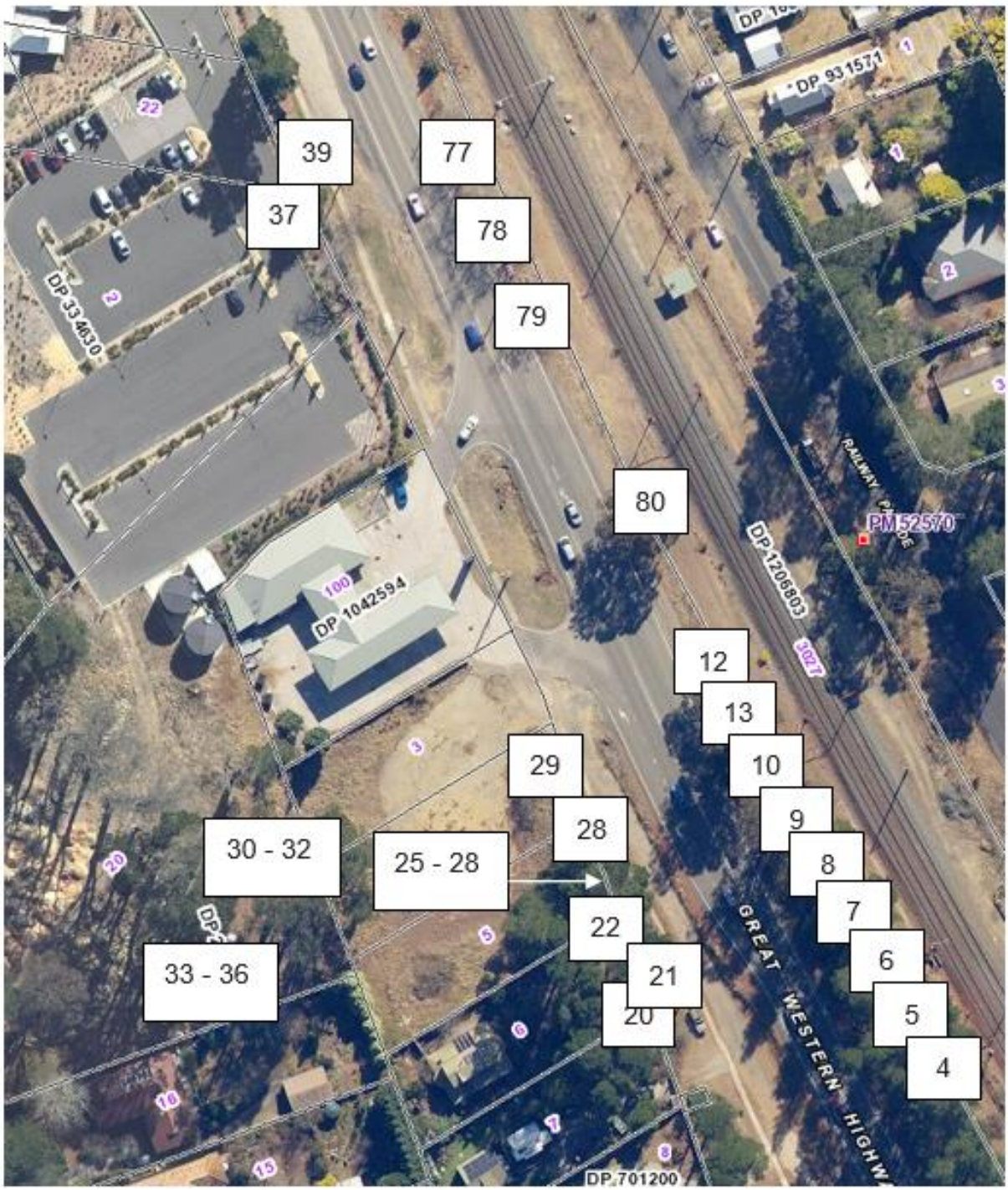


Figure 6.2: Plan 2, area of assessment illustrating tree location

Figure 6.3: Plan 3, area of assessment illustrating tree location

Figure 6.4: Plan 4, area of assessment illustrating tree location

Figure 6.5: Plan 5, area of assessment illustrating tree location

Avenue of Trees – the tree numbers assigned in this area are 4 – 12, 47 - 49 and 53 - 79

- Majority of northern trees (numbers 4 – 12, 47 – 73) are Western Red Cedars (*Thuja plicata*) and are estimated to be approximately 10 years old
- Southern area (opposite Hydro carpark) consists of London Plane (*Platanus* × *acerifolia*) (with tree numbers 74 – 79)

Many of the Western Red Cedars have symptoms of a sporadic pattern of leaf necrosis throughout the crown and this extends to dieback of the upper crown for the most affected trees. The symptoms are consistent with biotic pathogen and the dieback is likely to continue for the infected trees.

North of Bellevue Crescent – the tree numbers assigned in this area are 13 – 22

The trees present in this area are Monterey Pine (*Pinus radiata*) and all the trees observed are aged and display deadwood and stubs.

Vacant lots and Bellevue Crescent – the tree numbers assigned in this area are 23 -36

The trees present in this area are Monterey Pine (*Pinus radiata*). The ground area directly around these trees has been disturbed and therefore has removed symptoms that could support the initiation of windthrow. These trees are all in senescence and display deadwood and stubs.

Large trees within Hydro Majestic – the tree numbers assigned in this area are 37, 38 and 40 - 44

The trees present in this area are Monterey Pine (Pinus radiata) with some Monterey Cypress. These trees are of high significance based on their species, ownership, and amenity value to the streetscape.

6.1.3 Potential Impacts

Construction

The potential impacts during the construction of the Proposal are summarised below.

- Construction of the highway and installation of the pedestrian bridge would physically impact the Avenue of Trees through the reduction of its heritage curtilage. Critical root zones of the trees would be impacted, while some trees would also require removal.
- Construction of the alternate intersection design for Bellevue Crescent would impact the remaining stands of pine trees seemingly associated with the former Glenara Cottage. Some trees would require removal, while others may have their critical root zones impacted
- The excavation works associated with the Proposal may have a minor to moderate adverse impact on significant trees radiata pinus located within the Hydro Majestic's heritage curtilage through impact to critical root zones.
- The trenching activities required for the sub-surface utilities within the area of the TPZ's would impact the stability of the trees. The extent of cut and fill in an area would have an adverse impact a root system.
- The encroachment for the footpath/cycleway proposed is estimated to extend into the SRZ which poses the potential for destabilising trees based on severance of significant roots.
- The earthworks consisting of substantial fill up to 2 metres depth, being placed over the root zones (ie, TPZ's) would have adverse impact. The compaction of fill material would restrict essential water percolation and gas exchange required for the root system to function. The result would likely cause decline to these trees over the long term and limit the life expectancy.

Operational

Trees subjected to major encroachment

Trees 17-28, 39-41, 47, 51 and 59-60 are not directly impacted by the Proposal design, however, are located adjacent to the design footprint and would be subject to a major encroachment, that is, in excess of 10% of the TPZ. There would be impacts on these trees during construction of the Proposal. The extent and type of encroachment and the relative impacts are discussed below.

Trees 17-21: are adjacent to shared zone access for properties. The encroachment is estimated to extend into the SRZ, therefore, poses the potential for destabilising trees based on severance of significant roots.

Tree No. 22-28, 39-41, 47, 51 and 59-60: the encroachment is for the assumed footpath/cycleway. The construction and grades for this are unknown, although based on the low use, could allow for a surface and foundation that reduces impacts on the root system. The encroachment is estimated to extend into the SRZ, therefore, poses the potential for destabilising trees based on severance of significant roots.

The design would increase the impact on senescing trees; therefore, some impact irrespective of the design mitigation would occur and result in reducing the useful life expectancy of these trees.

Trees subject to removal

The trees identified below are within the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as follows.

- Trees1-12; within the footprint of the drainage design and possibly retaining wall.
- Trees 13-16; within the footprint of shared zone access to properties.
- Tree 48-50, 52-58, 61-80; within the proposed footpath/roadway

The maturity of these trees would commonly present an increased opportunity for transplanting, although the potential biotic infection associated with over half these trees would limit the viability for transplanting.

6.1.4 Recommendations from Arborist Report

***Pinus radiata* (Monterey Pine)**

The removal of Monterey Pine would impact views and vistas across Medlow Bath, impacting views to and from surrounding heritage items. They form part of the heritage register in their own right, titled ‘Avenue of Trees’, and provide an integral link with the founder and landscape of the Hydro Majestic Motel. Many of the original trees associated with this feature have since been removed and replaced with western red cedars. It is noted from the Statement of Heritage Impact (RPS, 2021) that the curtilage of Avenue of Trees (locally listed heritage item) will be impacted by the widening of the highway and trees will need to be removed. The SOHI identifies that the visual impacts of the removal of the Avenue of Trees is mitigated by replacement plantings of Norway Maples in the adjacent median.

In other areas of the proposal, the Monterey Pine has significance due to the heritage listing (i.e. Avenue of Trees) and amenity value (e.g. plantings in the Hydro majestic). However, these trees are in varying stages of senescence and accounting for the related risk, the future management would inevitably require tree removal. The branches of these are becoming over-extended, which offers concern regarding the exposure and prevailing wind and in relation to the high use target zones. That is, the location will increase the tendency for branch failure, as is the increasing formation of deadwood, although opportunity exists for risk management.

These trees are listed in the Street Tree Master Plan and refer to as “One hundred year old…., having once offered significant character to the area. It also continues to refer to the Monterey Pine as a weed” as they have “a relatively short life span, where sixty to eighty years is typical before the onslaught of senescence, and rarely does the species exceed one hundred years”.

Based on the limited useful life expectancy for these trees, the intent of modifying a design to allow for tree retention is not considered to be viable. The senescing character of the tree increases the species' susceptibility to pest and disease and risk for failure.

***Thuja plicata* (Western Red Cedar)**

To the east of the Great Western Highway, vegetation creates a buffer between Medlow Bath residential tree-lined streets and the existing highway and rail corridor.

These trees are relative newcomers to the landscape and are referenced to be the chosen species for replacing Monterey Pines. Many of the Western Red Cedars have symptoms of a sporadic pattern of leaf necrosis throughout the crown, and this extends to dieback of the upper crown for the most affected trees. The symptoms are consistent with biotic pathogen, possibly canker related. The dieback is likely to continue for those infected trees. Based on the retention of this or part of the planting, further assessment, diagnosis, and mitigation is recommended. Relocating of these Cedars are likely to be difficult noting the number of ones impacted by the biotic pathogen.

Trees to be retained

Trees No. 29, 37, 38, 42-44 and 49 are not directly located in the footprint of the proposed design, however, are subject to a minor encroachment. That is, the proportion (<10%) of encroachment provided by design will not adversely impact on the tree. These trees could be retained relative to the design.

Trees 30-36, 45 and 46 do not interfere with the proposed works. These trees should be retained without any impact.

Tree within protection zones

The trees 23-28, 40, 41 and 51 are located in adjacent lots, therefore should be retained and protected unless consent for these works is permitted by the tree owner and Blue Mountains City Council.

Tree protection measures would be required during the demolition and construction stage. The project arborist is contracted after the completion/confirmation of design work for the instruction of the protection measures implementation.

6.1.5 Revised safeguards and management measures

Additional safeguard recommended from the independent review is provided in Table 6-1. This would be included to the safeguards and management measures provided in the REF to mitigate impacts on non-Aboriginal heritage.

Table 6-1: Summary of additional safeguard and management measures to mitigate potential impacts to non-Aboriginal heritage.

No	Impact	Environmental Safeguards	Responsibility	Timing
HER09	Protection and management of trees	A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a Notice of Determination is issued, and they are to be provided with all related site documents	Contractor	Construction
HER10	Protection and management of trees	Prior to construction, assessment and documentation by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the Transport for NSW.	Contractor &Transport for NSW	Pre-construction and Construction

		• Pre-demolition – installation of the protection measures outlined in Appendix B of Arboricultural Impact Assessment Report. • During construction – for any further works required within the area of the TPZ, or decline related to the trees that have not been covered by Arboricultural Impact Assessment Report • During construction – for any crown modification including pruning or root disturbance.		
HER16	Protection and management of trees	Site induction: All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.	Contractor	Construction

6.2 Landscape character and visual Impacts

This section informs updates completed to the Urban Design, Landscape Character and Visual Impact Assessment Report completed for the Proposal. Further opportunities were identified to improve the landscaping and integrate the design of the pedestrian bridge with the existing character of the Proposal.

6.2.1 Methodology

The proposed bridge over the Great Western Highway and Main Western Rail Line would be a prominent structure in the village of Medlow Bath and would become a notable landmark on the journey through this part of the Upper Blue Mountains. As a result, the design of this bridge has been an important task for this Proposal. Three pedestrian bridge design options were generated during the concept phase to refine the design, to maximise the benefits and minimise the impacts on the proposal area. These options have been assessed based on the Proposal urban design principles, in conjunction with Transport's urban design guiding documents *Transport Around the Tracks* and *Beyond the Pavement*, to determine the best outcome for the site and surrounding context. The options considered and the analysis are discussed in the Landscape Character and Visual Impact Assessment Report (Spackman Mossop and Michaels, October 2021). The report is provided in Appendix 4.

6.2.2 Existing environment

The Medlow Bath Railway Station Group is listed on the State Heritage Inventory. The station building is described as demonstrating typical architectural elements of the standard Federation style island platform buildings that were built between Penrith and Lithgow when the line was duplicated.

Key heritage elements include the station building and associated signal room, the brick-faced island platform, and the northern footbridge. Planter beds that run along the length of the platform are not of heritage significance. The pedestrian access to the station is currently provided by:

- Pedestrian level crossing, city end of the platform, accessible from both Great Western Highway and Railway Parade. This method provides ramped access only. It is proposed that this pedestrian level crossing would be decommissioned as part of the overall Transport Access Program upgrade at Medlow Bath Station.
- Pedestrian overbridge at the country end of the platform, accessible from both Great Western Highway and Railway Parade. This method provides stepped access only. It is proposed that the western pedestrian access via Great Western Highway would be closed off (gated and accessible

for maintenance only) as part of the overall Transport Access Program upgrade at Medlow Bath Station.

6.2.3 Potential Impacts

Construction

Potential impacts during construction of the Proposal are identified in the REF. These impacts are consistent, and no further impacts are identified as a result of this additional assessment.

Operation

The new pedestrian bridge would provide a dominant feature, given its scale and materiality when compared to surrounding elements. The associated Proposal design would contribute to a better visual outcome; however, is the bridge would remain a dominant feature within the landscape. Although peripheral elements would be partially screened by existing buildings, rail infrastructure and existing vegetation, the bridge itself would remain somewhat visible and contribute to the overall magnitude of change. Planting information detailed in the Proposal landscape design would contribute to a reduction in magnitude over time, adding to the improvement of character.

The Urban Design, Landscape Character and Visual Impact Assessment outlines how key design initiatives have sought to minimise visual impacts. Specific architectural objectives and the Transport Bridge Aesthetics Design Guideline have been considered to address the placement, and siting of the proposed pedestrian bridge, whilst also highlighting specific detail of individual bridge elements.

6.2.4 Safeguards and management measures

No changes are proposed to the safeguards and management measures outlined in the REF. The additional assessment has provided detailed opportunities to further improve the design of the proposed works in particular for the pedestrian bridge and integrated Landscaping.

The road, verge, share footpaths, way finding and the pedestrian bridge have been designed to reflect elements already existing in Medlow Bath and integrate into the village character and heritage items as much as possible, as well as providing additional functionality.

Following our ongoing engagement with Heritage NSW and Blue Mountains City Council, the bridge design and station precinct is continuing to progress through a series of design challenge workshops to improve its fit with the surrounding heritage context.

Heritage and architectural specialists will be working with key stakeholders to develop the heritage experience between Medlow Bath Station and the Hydro Majestic in a manner that draws in local context and character. This will be required as part of the Section 60 Heritage Approval process.

Further community information sessions will be held as the design matures, to engage the community on progress made.

6.3 Pedestrian Bridge Option Report

A report summarising the development process undertaken to consider options for improving pedestrian access across the highway and Medlow Bath Railway Station leading to the selection of a pedestrian bridge is provided as Appendix 5 of this report.

The report presents the following:

- strategic options considered
- demonstrates the case for a pedestrian bridge
- presents structural options considered

- details the design refinements made

The report also presents the role heritage and urban design played through the development of the preferred pedestrian bridge option as well as the range of technical standards that held influence over key design decisions including the selection of weathering steel as the preferred structural form.

6.4 SoHI for Station and Bridge

6.4.1 Scope

Medlow Bath Railway Station is included on the State Heritage Register (SHR) (SHR No. 01190) and RailCorp Section 170 Heritage and Conservation Register (SHI No. 4801011). It is also identified as an item of State significance on the Blue Mountains Local Environmental Plan (LEP) 2015 (Item MB003).

A Statement of Heritage Impact (SOHI) for proposed works to the Medlow Bath Railway Station (including pedestrian bridge) was completed (RPS, 2021) to support the Section 60 application under the *Heritage Act 1977*.

The scope of the assessment included the following works:

- Works within SHR curtilage of Medlow Bath Railway Station:
    - construction of a new pedestrian footbridge across the widened Great Western Highway and Medlow Bath station
    - alterations to northern station entrance
    - upgrades to station platform
    - provision of an accessible path between the kiss and ride, accessible parking and lift and stair entries to the new footbridge on railway parade
    - decommissioning and removal of the existing non-DSAPT compliant level crossing
    - Electrical upgrade work, including provision of a new padmount transformer in the rail corridor
    - New services routes (Low Voltage (LV) and communications) along the entire station platform, and associated services pits
    - Relocation of three overhead wiring structures and relocation of the aerial High Voltage (HV) (11kV)
    - minor building modifications that may be required to accommodate new or upgraded electrical equipment including a main switchboard, new or upgraded station communications equipment and other station services
    - new stormwater drainage connections for the new footbridge, lifts and canopies to existing systems
    - upgrades to services, utilities and lighting
    - improvement to station security and communication systems
    - relocation of station furniture
    - provision of wayfinding signage and other station signage as required for the new work
- Works outside the SHR curtilage of Medlow Bath Railway Station:
    - provision of a new kiss and ride space on Railway Parade
    - upgrades to the commuter carpark on Railway Parade, including provision of new accessible parking, new sealed surface and line marking
    - provision of accessible paths between the bus stops on the eastern and western sides of the widened Great Western Highway and the new footbridge stair and lift entries

The impact assessment considered physical and visual impacts as well as potential archaeological impacts related to the construction of the new pedestrian bridge and modifications to the station and specifically to:

- Construction of a new pedestrian footbridge
- Alterations to northern station entrance

- Platform upgrades
- Railway Parade
- Great Western Highway
- Decommissioning and removal of existing pedestrian level crossing
- Electrical upgrade work
- Relocation of overhead wiring structures (OHWS)
- Underground 11kV aerial line
- Ancillary work
- Ancillary facilities

To mitigate the potential of impacts to heritage items, the heritage consultants were also part of the design process of the bridge and station modifications. This included the attendance at several design meetings and review of design plans to advise architects, landscape designers and engineers on options to minimise the impact of the proposed works.

6.4.2 Summary of Impacts and Conclusions

Enhancements from the proposal

The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area:

Aspect	Reason
Retention and adaptive re-use of significant station components	Retaining significant components while upgrading the station to comply with safety and Disability Standards Accessible Public Transport (DSAPT) requirements, enables the continued use of the station.
Retaining access from the 1902 footbridge	Blocking access from the Great Western Highway to the 1902 footbridge, yet retaining access to the station from Railway Parade, maintains the physical arrangement between significant station components such as the footbridge, platform and station buildings.
Replacement of garden beds requiring removal for works	The garden beds along the platform relate to the overall character of the station and have been present at the station since the 1902 platform was constructed. Garden beds required to be removed would be relocated elsewhere along the platform and planted with similar species to existing garden beds to retain the existing character as much as possible.
Upgrades to the communications facilities in the former Station Master's Office of the platform building	Which has previously been heavily modified, confines impact to previously impacted areas.
Material palette and design	Using contrasting materials and forms to clearly separate old from new. Material expression taking cues from the surrounding context with brick and timber responding with texture.

Potential Impacts from the Proposal

Some aspects of the proposal could have the potential to impact heritage significance. The following table summarises the aspect, provides consideration for the potential impact and the mitigation measure adopted to reduce impact.

Aspect	Reason	Mitigation Measure
New pedestrian footbridge	The new pedestrian footbridge would introduce a new visual element to Medlow Bath Railway Station that would visually dominate the SHR listed heritage item's setting as well as impact views to and from the station complex. The new pedestrian bridge would also impact views and vistas across Medlow Bath, impacting views to and from surrounding local heritage items.	In order to mitigate this impact, an open truss structure was selected over solid forms to reduce the overall bulk and scale of the bridge. Materials were selected for functionality and as a contrast to surrounding heritage fabric to clearly separate old from new. Archival recording of Medlow Bath Railway Station and its setting has been recommended as an additional mitigation measure.
Lighting (Luminance levels)	The station does not currently meet safety requirements for luminance levels under either AS/NZS 1158.3.1: 2020 – Pedestrian area (Category P) lighting – Performance and design requirements or AS1428.2 Design for access and mobility Part 2: Enhanced and additional requirements – Buildings and facilities. Additional lighting across the platform, pedestrian bridge, 1902 footbridge and platform buildings is required to bring luminance levels up to standard.	This impact has been mitigated to some degree through the proposed lighting design bringing the station lighting up to the current standard of 42 lux for open areas in line with *AS/NZS 1158.3.1: 2020* as opposed to the newly introduced requirements of 150 lux for open platform areas specified by *AS1428.2.* Not only has this reduced the number of lights required across the station, it has reduced potential light spill
Installation of IMBS within the signal room.	The signal room is considered a rare intact example of a separate platform level signal box along Blue Mountains Line. Installation of an IMBS would alter the interior of the signal room, requiring penetrations to the floor and walls and alteration of the door swing.	This impact has been mitigated through use of a stand-alone fire rated cupboard that does not require fixing to the floor or wall, and which fits through the current signal room door, removing the need to alter the door size.
Introduction of a retaining wall	The proposed retaining wall along the western rail cutting opposite the platform building and signal room would add a new built form adjacent to significant structures and would impact significant views and vistas of the station complex.	This impact has been somewhat mitigated through the selection of material finishes. The finish of the retaining wall is consistent with precedents along the Blue Mountains rail corridor (e.g. exposed aggregate finish to concrete form-liner panels to accentuate a darker lineal pattern) and would also match that of the abutting retaining wall being completed by other parties for visual cohesion.
Cumulative impact	The cumulative impact of the proposal results in moderate to major adverse impact on the significance of Medlow Bath Railway Station.	The detailed design phase of the proposal was undertaken in consultation with a heritage consultant. Impact to significant fabric has been reduced where safety requirements allow.

Sympathetic solutions as part of the proposal

The following sympathetic solutions have been considered and discounted for the following reasons:

- Both a tunnel and pedestrian underpass have previously been suggested as alternatives to the pedestrian footbridge. Transport has indicated neither option is feasible. There is no location in Medlow Bath with the available space required to allow a pedestrian underpass below both the railway and the highway.
- Transport considered a number of location options for the pad mount transformer. Initial plans placed the transformer further north, away from heritage structures. However, this option was

discounted because connecting to the Sydney Trains HV network would not provide compliant earthing and bonding.

- Transport considered a do-nothing option. This option was discounted as it would not meet DDA or DSAPT requirements.

The proposal is considered necessary for improved accessibility. While the proposal would impact the heritage significance of the station, the impact of the proposal has been mitigated to a degree through detailed design.

6.4.3 Recommendations

The following recommendations were provided by the heritage specialist:

Recommendation	Detail
Recommendation 1: Archival photographic recording	Prior to construction, an archival photographic recording of Medlow Bath Railway Station is to be prepared in accordance with the NSW Heritage Division of the Department of Environment and Heritage guidelines titled "Photographic Recording of Heritage Items using Film or Digital Capture". The photographic should be prepared by a heritage consultant and must document significant heritage elements and items that will be impacted by the proposed works. The record should also document significant views and vistas as selected by the heritage consultant.
Recommendation 2: Heritage Induction	a. Works within the proposal area are being undertaken in an area of heritage significance. Prior to works commencing, contractors shall be briefed as to the sensitive nature of the proposal area and informed of any recommended mitigation measures or controls required b. Non-Aboriginal heritage awareness training must be provided for all contractors and personnel prior to commencement of works to outline the identification of potential heritage items and associated procedures to be implemented in the event of the discovery of non-Aboriginal heritage materials, features or deposits (that is, unexpected finds), or the discovery of human remains.
Recommendation 3: Protection of significant fabric	Works should be undertaken with care. To avoid impact to significant fabric during the construction of the proposal, it is recommended: a. measures, as determined in consultation with a suitably qualified conservation specialist, must be put in place to protect significant fabric during proposed works, especially during bridge construction, resurfacing of the platform, removal of OHWS and installation of electrical pits. b. machinery should be placed with sufficient clearance to significant heritage structures to avoid any inadvertent harm to significant fabric or incidental damage from vibration as per the Transport recommended minimum working distances for vibration intensive plant from sensitive receiver c. air brick raising and replacement on platform building is to be undertaken by an appropriately qualified bricklayer/builder with expertise in heritage buildings. d. Works to 1902 footbridge i. gate at western end of 1902 footbridge should be stand-alone and not affixed to heritage fabric ii. new electrical conduits on 1902 footbridge should not be attached to significant fabric.

	e. removal of significant heritage light poles i. heritage light poles temporarily removed from the platform during works should be stored safely and securely on site until reinstated on the platform. ii. heritage light poles removed from the decommissioned level crossing should be stored safely in a secure Transport facility for future use. f. installation of electrical and data services is to be completed in accordance with Sydney Trains (2017) Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites g. Ancillary works should be undertaken in accordance with the following Sydney Trains guidelines: - Conservation Guide: Railway Station Platform Furnishings (2012) – Conservation Guide: Railway Station Platforms (2013) – Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites (2017) – Station Components Guide (2017).
Recommendation 4: Heritage interpretation	A heritage interpretation plan should be formulated and implemented in accordance with the Heritage NSW, Interpreting Heritage Places and Items (Heritage Office (former) 2005). This is to be undertaken with the consent and co-operation of authorised owners or land managers and Blue Mountains City Council. Heritage interpretation should communicate the history of Medlow Bath Railway Station, with reference to its identified heritage items, and enable audiences to engage with the significance of the place and the wider context of Medlow Bath and Greater Blue Mountains area. It could be integrated into the broader cultural heritage design and heritage interpretation strategy for the overall Great Western Highway Katoomba to Lithgow upgrade project.
Recommendation 5: Management of archaeological potential	The potential for archaeological resources within the proposal area is low to moderate, and the archaeological resources are unlikely to hold research potential. If identified, it is recommended that any archaeological resources are recorded by a suitably qualified archaeologist in accordance with Heritage NSW standards including How to Prepare Archival Records of Heritage Items and Photographic Recording of Heritage Items Using Film and Digital Capture; however, no further archaeological management is required. If archaeological resources not identified in the assessment of archaeological potential are identified, the Transport (2016) Unexpected Finds Procedure should be implemented.
Recommendation 6: Further assessment required for any design modification	If the proposed works, or proposal area, are modified to those discussed in this report, additional heritage advice may be required to appropriately manage and mitigate any potential impacts caused by these changes.

These recommendations have been incorporated into the environmental management measures in Section 8.

7. Revised Project Boundary

Since the REF was displayed in July 2021, the construction boundary has slightly from what was assessed as the environmental boundary in the REF.

Specific changes are at the following locations and as identified in **Figure 7.1** (brown is revied construction boundary and green is the environmental boundary used in the July 2021 REF):

Location#	Description	Reason for Change
1	Western footing of the proposed bridge	During detailed design the bridge was moved north to allow for a greater clearance of over head wires. Also adjoining Lot will be used for set down of materials during construction.
2	North of Railway Parade	Project connection to neighbouring Great Western Highway duplication package
3	Park Street (off Railway Parade) and adjacent strip within Lot 166/DP751627	Provides additional access for commuter carpark.
4	Road corridor of Railway Parade south of Medlow Park	Additional utilities (including Telstra) as part of additional underline crossing

as numbered and identified yellow in Figure 7.1

Figure 7.1: Changes of the construction boundary from the REF environmental boundary

These additional areas do not pose a potential impact environmental impact (e.g., biodiversity and heritage) and therefore no additional assessments are required.

8. Revised environmental management measures

No.	Impact	Environmental safeguards	Responsibility	Timing
GEN1	General – minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Transport Environment Manager prior to commencement of the activity. As a minimum, the CEMP would address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity. The CEMP would be updated as required throughout the construction contractor.	Consultant (design) Contractor (principal)	Detailed design Pre-construction Construction
GEN2	General – notification	All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the activity would be notified at least five days prior to commencement of the activity.	Contractor (principal) Transport for NSW	Pre-construction Construction
GEN3	General – environmental awareness	All personnel working on site would receive training to ensure awareness of environment protection requirements to be implemented during the project. This would include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include: • areas of heritage sensitivity/heritage items • threatened species habitat • adjoining residential areas requiring particular noise management measures • alternative traffic arrangements.	Contractor (principal)	Detailed design Pre-construction Construction
BIO1	Biodiversity	A Flora and Fauna Management Plan will be prepared in accordance with Transport's *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011) and implemented as part of the CEMP. It would include, but not be limited to: • plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas requirements set out in the *Landscape Design Guideline* (Roads and Maritime Services, 2018)	Consultant (design) Contractor	Detailed design Pre-construction

		• pre-clearing survey requirements procedures for unexpected threatened species finds and fauna handling procedures addressing relevant matters specified in the *Policy and guidelines for fish habitat conservation and management* (Department of Primary Industries Fisheries, 2013) • protocols to manage weeds and pathogens.		
BIO2	Removal of native vegetation	Areas for native vegetation and habitat removal will be minimised through detailed design.	Consultant (design)	Detailed design
BIO3	Removal of native vegetation	Pre-clearing surveys and habitat removal would be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011). Where possible, hollow bearing trees should be retained or relocated.	Contractor (principal)	Pre-construction
BIO4	Removal of native vegetation	Vegetation removal would be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011).	Contractor (principal)	Construction
BIO5	Removal of native vegetation	Native vegetation will be re-established in accordance with *Guide 3: Re-establishment of native vegetation* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011).	Contractor (principal)	Post construction
BIO6	Removal of native vegetation	The unexpected species find procedure would be followed under the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal area.	Contractor (principal)	Construction
BIO7	Aquatic habitat	Aquatic habitats would be protected in accordance with *Guide 10: Aquatic habitats and riparian zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011) and Section 3.3.2 Standard precautions and mitigation measures of the *Policy and guidelines for fish habitat conservation and management Update 2013* (Department of Primary Industries Fisheries, 2013).	Contractor (principal)	Construction
BIO8	Injury and mortality of fauna	Fauna would be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011).	Contractor (principal)	Construction
BIO9	Invasion and spread of weeds	Weed species would be managed in accordance with *Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011).	Contractor (principal)	Construction
BIO10	Invasion and spread of pests	Pest species will be managed within the Proposal area.	Contractor (principal)	Construction
BIO11	Invasion and spread of pathogens and disease	Pathogens would be managed in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity of RTA projects* (Roads and Traffic Authority, 2011).	Contractor (principal)	Construction
HYD1	Blockage causing increased	Develop a blockage assessment of the pavement and cross drainage strategy, and implement the strategy.	Consultant (design)	Detailed design

	flooding potential		Contractor (principal)	Pre-construction Construction
HYD2	Overland flows causing localised flooding	Flow diversion bunds and sediment fencing are to be used for redirection of overland flows to dedicated management areas including sediment basins and ultimately to discharge locations.	Contractor (principal)	Construction
WAT1	Soil degradation and water pollution	A Soil and Water Management Plan would be prepared and implemented as part of the CEMP. The plan would identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks would be addressed during construction. The Soil and Water Management Plan would be reviewed by a soil conservationist on the Transport list of Registered Contractors for Erosion, Sedimentation and Soil Conservation Consultancy Services. The Plan would then be revised to address the outcomes of the review and implemented.	Consultant (design) Contractor (principal)	Detailed design Pre-construction Construction
WAT2	Soil degradation and water pollution	Site specific Erosion and Sediment Control Plan/s would be prepared and implemented as part of the Soil and Water Management Plan. The Plan/s would include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather. The site specific Erosion and Sediment Control Plan/s would be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and *Volume 2D* (DECCW 2008), commonly referred to as the 'Blue Book'.	Consultant (design) Contractor (principal)	Detailed design Pre-construction Construction
WAT3	Run-off velocity (scour)	Level spreaders would be installed at all discharge locations to the natural surface used to reduce velocity and depth of the flows reaching the natural watercourses /s. New discharge outlets would be designed with appropriate energy dissipation and scour protection measures as required to minimise the potential for sediment disturbance and resuspension in the receiving waters. Outlet design and energy dissipation/scour protection measures would be informed by drainage modelling. Check dams or velocity managing devices are installed into flow paths particularly in areas with steep gradients.	Contractor (principal)	Construction
WAT4	Water quality	Maintenance requirements for all stormwater treatment systems and devices installed as part of the Proposal would be identified and included in relevant operational maintenance schedules/systems.	Contractor (principal) Transport for NSW	Construction Post construction
WAT5	Spill containment	Dedicated diversion equipment would be implemented for the storage of spills to avoid direct discharge to receiving watercourses.	Contractor (principal)	Pre-constructionConstruction

WAT6	Sediment run-off from construction site	Sediment basins would be designed and constructed for the collection of sediment runoffs through reduction of flow velocity.	Contractor (principal)	Construction
WAT7	Sediment run-off from construction site	The extent of ground disturbance and exposed soil would be minimised to the greatest extent practicable to minimise the potential for erosion.	Contractor (principal)	Construction
WAT8	Sediment run-off from construction site	Disturbed ground and exposed soils would be permanently stabilised and proposed landscaped areas would be suitably profiled and vegetated as soon as possible following disturbance to minimise the potential erosion.	Contractor (principal)	Construction
CON1	Contaminated land	A targeted Phase 2 investigation providing general coverage of the proposed alignment and areas of potential contamination sources (including areas where fill would be encountered during construction and hydrocarbon migration from the United Petrol Station) would be undertaken. The investigation would address the potential risk that fill material may pose to construction workers and future users of the site. Assessments would be carried out in accordance with guidance made or endorsed by the NSW EPA. The contaminated land investigations would be carried out and the report verified by a suitably qualified and experienced environmental consultant.	Consultant (design)	Pre-construction
CON2	Contaminated land	A Contaminated Land Management Plan would be prepared in accordance with the *Guideline for the Management of Contamination* (RMS, 2013) and implemented as part of the CEMP. The plan would include, but not be limited to: • capture and management of any surface runoff contaminated by exposure to the contaminated land • any further investigations required to determine the extent, concentration and type of contamination • management of the remediation and subsequent validation of the contaminated land, including any certification required • measures to ensure the safety of site personnel and local communities during construction. If contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area would cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Transport Environment Manager and/or EPA.	Contractor (sub-consultant) Contractor (principal)	Pre-construction Construction
CON3	Pollution from run-off	The following measures would be included to limit sediment and other contaminations entering receiving waterways: • chemicals would be stored within a sealed or bunded area • appropriate controls would be in place where plant is stored • run-off from ancillary facilities would be controlled and treated before discharging into downstream waterways • vehicle movements would be restricted to designated pathways where feasible. Areas that would be exposed for extended periods, such as car parks would be stabilised where reasonably practicable.	Contractor (principal)	Construction

CON4	Accidental spill	A site specific emergency spill plan would be developed, and include spill management measures in accordance with the Transport *Code of Practice for Water Management* (RTA, 1999) and relevant EPA guidelines. The plan would address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport and EPA officers). The plan would be reviewed and updated throughout construction as necessary.	Consultant (design) Contractor (principal)	Pre-construction Construction
TRA1	Traffic and transport	A Traffic Management Plan would be prepared and implemented as part of the CEMP. The plan would be prepared in accordance with the *Traffic Control at Work Sites Manual* (Transport, 2020) and *QA Specification G10 Control of Traffic*. The plan would include: • confirmation of haulage routes • measures to maintain access to local roads and properties • site specific traffic control measures (including signage) to manage and regulate traffic movement • measures to maintain pedestrian and cyclist access • requirements and methods to consult and inform the local community of impacts on the local road network • access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • a response plan for any construction traffic incident • consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • monitoring, review and amendment mechanisms.	Contractor (sub-consultant) Contractor	Pre-construction Pre-construction Construction
TRA2	Traffic and transport	The local bus operators would be consulted to confirm alternative temporary bus stop and operations during construction. The local community would be notified about the agreed local temporary bus stop location, as coordinated and managed under the consultation strategy.	Contractor (principal)	Pre-construction
TRA3	Property access	Property access would be maintained where feasible and reasonable and property owners would be consulted before starting any work that may temporarily restrict or control access. (Side) road and lane closures would be minimised where feasible and reasonable.	Contractor (principal)	Pre-construction Construction
NOI1	Construction noise and vibration	A Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP. The plan would generally follow the approach in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009) and include the following: • the plan would consider potential vibration impacts associated with construction activities and would identify feasible and reasonable measures to mitigate these impacts, including safe working distances • all potential significant noise and vibration generating activities associated with the activity • feasible and reasonable mitigation measures to be implemented, taking into account *Beyond the Pavement 2020: Urban design approach and procedures for road and maritime infrastructure planning, design and construction* (Transport Centre for Urban Design, 2020) • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures	Consultant (design) Contactor (principal) Contractor (sub-consultant)	Detailed design Pre-construction Construction

		• contingency measures to be implemented in the event of non-compliance with noise and vibration criteria • stakeholder engagement would be a key feature of these measures, particular with key stakeholders such as the Hydro Majestic Hotel. • vibration sensitive receivers identified would require careful consideration when planning works and, dependent on the nature of the works, may require vibration monitoring throughout. • The plan would be reviewed and updated as necessary throughout construction.		
NOI2	Out of hours works	As part of the Noise and Vibration Management Plan, an out-of-hours work protocol would be developed, including any requirements set under an EPL which defines: • all scheduled and planned out-of-hours activities • any oversized and other deliveries needing to take place out-of-hours as required by the police or other authorities for safety reasons · • other tie-in, utility connection and intersection work that may need to take place out-of-hours for road user safety issues • out-of-hours emergency work needed to prevent the loss of life, property, to prevent harm or as agreed under negotiation with EPA and affected sensitive receivers • the record-keeping process for capturing agreed and emergency out-of-hours work • very noisy activities should, as much as reasonably practicable, be programmed for normal working hours. If the work cannot be undertaken during the day, it should be completed before 12:00am. In particular, there should be no jackhammering or saw cutting after midnight.	Contractor (principal)	Pre-construction Construction
NOI3	Construction noise and vibration	All sensitive receivers (eg schools, local residents) likely to be affected would be notified at least seven days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification would provide details of: • the Proposal • construction period and construction hours • contact information for project management staff • complaint and incident reporting how to obtain further information.	Contractor (principal)	Pre-construction Construction
NOI4	Construction noise and vibration	The following general mitigation measures would be applied as reasonably practicable: • limit work to daylight hours and only night works during notified road closures • perform noisy work during less sensitive time periods • select low-noise plant and equipment • ensure equipment has quality mufflers installed • use smaller/lower capacity plant in reference to the safe working distances • concentrate noisy activities at one location and move to another as quickly as possible • vehicle movements outside construction hours, including loading and unloading operations, should be minimised and avoided where reasonably practicable • ensure equipment is well maintained and fitted with adequately maintained silencers • use only necessary sized equipment • implement worksite induction training, educating staff on noise sensitive issues and the need to make as little noise as reasonably practicable • consider alternatives, such as manually adjustable or ambient noise sensitive types (“smart” reversing alarms) and closed-circuit TV systems • consider installing temporary construction noise barriers	Contractor (principal)	Pre-construction Construction

		• install noise-control kits for noisy mobile equipment and shrouds around stationary plant, as necessary.		
NOI5	Construction noise	Noise management controls would be implemented early in the work program to benefit receivers while the Proposal is being built. Where possible at property treatments would be completed prior to road works commencing in consultation with acoustic engineers and suitable building contractors.	Transport for NSW Consultant (design) Contractor (principal)	Pre-construction Construction
NOI6	Construction noise and vibration	Plant would be located as far from residences as reasonably practicable, while still enabling the construction activities to proceed. Plan for the use of lower noise/vibration generating equipment where reasonable and feasible.	Contractor (principal)	Pre-construction Construction
NOI7	Construction vibration	Any proposed works within the minimum safe working distances would be undertaken with concurrent vibration measurements to ensure the cosmetic damage criteria are not exceeded at sensitive receiver locations.	Contractor (principal) Contractor (sub-consultant)	Construction
NOI8	Construction vibration – heritage structures	Vibration resulting from construction and received at any heritage structure would be managed in accordance with *German Standard DIN 4150: Part 3 – 1999 Structural Vibration in Buildings: Effects on Structures.* Where required, monitoring would be undertaken to ensure guideline values are achieved, or additional vibration mitigation measures developed to manage risks.	Contractor (principal) Contractor (sub-consultant)	Construction
NOI9	Operational noise	Architectural treatment would be investigated for properties where there are predicted exceedances of the noise criteria. Where deemed warranted, architectural treatment would be implemented early in the construction program where reasonably practicable	Transport for NSW Consultant (design) Contractor (principal)	Pre-construction Construction
ABO1	Aboriginal heritage	The *Standard Management Procedure – Unexpected Heritage Items* (Roads and Maritime Services, 2015) would be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Transport does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the procedure) is not in place. Work would only re-commence once the requirements of that procedure have been satisfied.	Contractor (principal)	Construction
HER1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan would be prepared and implemented as part of the CEMP. It would provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage. The plan would be prepared in consultation with Heritage NSW.	Consultant (design) Contractor (principal)	Pre-construction Construction

HER2	Non-Aboriginal heritage	The detailed design would be developed and refined in consultation with heritage and urban design consultants. The detailed design would aim to further minimise the impact of the Proposal, with particular reference to the pedestrian bridge through the use of appropriate form, proportion and materials. Bulk should be minimised, and new built forms should be clearly separate from existing heritage fabric. Where appropriate, the detailed design should also respond to existing and significant architectural detail, such as the architectural detailing of the station building, or the footbridge. Detailed design should be undertaken in accordance with appropriate Sydney Trains and Transport guidelines, including: • Railway Footbridges Heritage Conservation Strategy (NSW Government Architect's Office Heritage Group for Sydney Trains, 2016) • Heritage Platforms Conservation Management Strategy (Australian Museum Consulting for Sydney Trains, 2015) • Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites (Sydney Trains, 2017) • Station Components Guide (Sydney Trains 2017).	Consultant (design)	Detailed design
HER3	State heritage	A Section 60 Application would be required for proposed works within the SHR curtilage of Medlow Bath Railway Station. The Application must be granted prior to works commencing.	Transport for NSW Contractor (principal)	Pre-construction
HER5	Non-Aboriginal heritage awareness training	• Works within the proposal area are being undertaken in an area of heritage significance. Prior to works commencing, contractors would be briefed as to the sensitive nature of the proposal area and informed of any recommended mitigation measures or controls required. • Non-Aboriginal heritage awareness training would be provided for all contractors and personnel prior to commencement of works to outline the identification of potential heritage items and associated procedures to be implemented in the event of the discovery of non-Aboriginal heritage materials, features or deposits (that is, unexpected finds), or the discovery of human remains	Contractor (principal)	Pre-construction
HER6	Non-Aboriginal heritage protection of significant fabric	Works would be undertaken with care. To avoid impact to significant fabric during the construction of the Proposal the following is recommended: • machinery should be placed with sufficient clearance to significant heritage structures to avoid any inadvertent harm to significant fabric or incidental damage from vibration as per the Transport recommended minimum working distances for vibration intensive plant (refer Table 6-27 of the REF). In particular, care should be taken when working near: o Hydro Majestic's stone fence o Medlow Bath Railway Station platform structures, platform edges and footbridge o Former Post and Telegraph Store o Urunga o Melbourne House, Cosy Cot and Sheleagh Cottage, in particular Lot 1 Great Western Highway	Contractor (principal)	Pre-construction Construction

		○ Sandstone Railway culvert ○ archaeologically sensitive vacant land north of the United Petrol Station • Protection of significant fabric – Hydro Majestic stone fence ○ protective barriers or fencing should be erected between the works corridor boundary and the Hydro Majestic's stone fence for the duration of works within the vicinity of this significant fabric to ensure no inadvertent harm occurs, where warranted and reasonably practicable ○ machinery and works should be placed with sufficient clearance to significant fabric and any associated protective barriers to avoid inadvertent harm from machinery or incidental damage from vibration ○ vibration monitoring of the stone fence should be put in place for the duration of works • Protection of significant fabric – Sandstone Railway culvert ○ redundancy of the Sandstone Railway culvert should not include work to significant fabric ○ if closure or blocking of the culvert is required, these works should be undertaken in a manner that would not impact significant fabric ○ if work to significant fabric is required, this should be undertaken in consultation with either a heritage architect or heritage consultant, and be conducted in a manner that minimises harm as much as practicable • Protection of significant fabric – bus shelter (with mural) ○ measures should be put place to protect significant fabric of the bus shelter during its proposed removal and relocation ○ relocation position, and details of where and how it would be removed, stored and relocated, should be determined in consultation with Blue Mountains City Council ○ after relocation, conservation of the mural should be undertaken to prevent further loss, or to sympathetically reinstate missing portions • Protection of significant fabric – advertising sign ○ if removal of the advertising sign is required for the Proposal, it should be salvaged and relocated ○ relocation position, and details of where and how it would be removed, stored and relocated, should be determined in consultation with Blue Mountains City Council ○ if removal of the advertising sign is not required for the Proposal, appropriate measures should be put in place to protect it during proposed works, such as the installation of protective barriers or fencing		
HER7	Protection and management of trees	Management and protection measures recommended in the Arboricultural Impact Assessment should be implemented accordingly to ensure the protection and management of significant trees throughout the implementation of the Proposal.	Contractor (principal) Contractor (sub-consultant)	Pre-construction

HER8	Tree replacement	Trees removed as part of the Proposal within the heritage curtilage of Hydro Majestic (Item No.MB002), Avenue of trees (formerly Avenue of Radiata Pines) (Item No.MB015) or Medlow Bath Hydro Majestic original walking track complex (only the parts within the grounds of the Hydro Majestic) (Blue Mountains LEP 2015 Item No.MB026) would be replaced in a manner that is consistent with, and accurately reflect, the extent, nature and significance of the respective heritage item. The location, species and number of trees to be planted would be determined in consultation with the land owner, Blue Mountains City Council and a qualified arborist with reference to the identified heritage significance of the respective heritage item.	Contractor (principal)	Construction
HER9	Protection and management of trees	A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a Notice of Determination is issued, and they are to be provided with all related site documents	Contractor (sub-consultant)	Construction
HER10	Protection and management of trees	Prior to construction, assessment and documentation by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the Transport for NSW.	Contractor (principal) Transport for NSW	Pre-construction Construction
HER11	Movable heritage	All moveable heritage identified as part of this assessment would be managed in accordance with a moveable heritage procedure. Moveable heritage identified on Hydro Majestic (Blue Mountains LEP Item No. MB002) land would be managed in accordance with Section 6.5, *Conserving Moveable Heritage, in the Hydro Majestic Hotel, Medlow Bath, Conservation Management Plan* (Graham Brooks and Associates, 2010).	Contractor (principal)	Construction
HER12	Before and after photographic record	Prior to construction, an archival photographic recording of the heritage items impacted by the proposed works is to be prepared in accordance with the NSW Heritage Division of the Department of Environment and Heritage guidelines titled "Photographic Recording of Heritage Items using Film or Digital Capture". The photographic should be prepared by a heritage consultant and must document significant heritage elements and items that would be impacted by the proposed works. The record should also document significant views and vistas as selected by the heritage consultant. This archival recording should include the following items as a minimum: • Medlow Bath Railway Station Group (SHR No.01190, Transport Section 170 SHI No. 4801011, Blue Mountains LEP 2015 Item No. MB003) • Hydro Majestic (Item No. MB002) • Former Post and Telegraph Store (Item No. MB008) • Avenue of Trees (Item No. MB015) • Urunga (Item No. MB017) • Melbourne House, Cosy Cot, Sheleagh Cottage (Item No. MB019) • Medlow Bath Hydro Majestic original walking track complex (only the parts within the grounds of the Hydro Majestic) (Blue Mountains LEP 2015 Item No. MB026) • Bus Shelter (potential heritage item) • Sandstone Railway culvert (potential heritage item) • Advertising sign (potential heritage item).	Contractor (sub-consultant)	Pre-construction, Operation
HER13	Heritage interpretation	A heritage interpretation plan would be formulated and implemented in accordance with the Heritage NSW, *Interpreting Heritage Places and Items* (Heritage Office (former) 2005) as part of the proposed upgrade of the Great Western Highway. This is to be undertaken with the consent and co-operation of authorised owners or land managers and Blue Mountains City Council.	Transport for NSW	Pre-construction

		Heritage interpretation should communicate the history of Medlow Bath, with reference to its identified heritage items, and enable audiences to engage with the significance of these places and the wider Blue Mountains area. It should be integrated into the broader cultural heritage design and heritage interpretation strategy for the overall Great Western Highway Katoomba to Lithgow Upgrade Program, and pick up themes relevant to the overall Great Western Highway route as well as Medlow Bath.		
HER14	Non-Aboriginal heritage	In the event that unexpected archaeological resources are identified in the course of the Proposal, all work in the affected area should cease, the area should be cordoned off, and Heritage NSW should be notified, in accordance with Section 146 of the *Heritage Act 1977*. The Transport (2016) *Unexpected Heritage Finds Guideline* should be adhered to.	Contractor (principal)	Construction
HER15	Non-Aboriginal heritage	If the proposed works, or Proposal area, are modified to those discussed in this report, additional heritage advice may be required to appropriately manage and mitigate any potential impacts caused by these changes.	Contractor (principal) Transport for NSW	Pre-construction construction
HER16	Protection and management of trees	Site induction: All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.	Contractor (principal)	Construction
LAN1	Proposal Design	The following principles are to continue to be incorporated into the overall design of the Proposal: • the motorists experience and attract people to town centre through the feature planting characteristic of the Blue Mountains area • screening of rail infrastructure where possible, using shrubs and trees, both native and exotic depending on the location • rounding of cut and fill batters to help integrate into the existing landform and create a more naturalised appearance • exploration of opportunities to reduce the Proposal footprint and need for temporary and ancillary sites to reduce impacts on surrounding landscape areas • Consolidating barriers and fences to increase visual access and pedestrian permeability in civic spaces • selection of lighting, signage and bus stops to compliment the Great Western Highway character • retention of views to existing non-aboriginal heritage items identified in the contextual analysis	Transport for NSW	Detailed design
LAN2	Bridge Design	The following principles are to continue to be incorporated into the design of the bridge: • The simplification of the bridge forecourts to enhance sightlines and access and enable equitable access for all users, • The refinement of the pedestrian bridge design to reduce its visual impact, by increasing the visual permeability, the positioning of the bridge to reduce the required height and the visual elongation of the bridge through the design of the bridge truss bays that extend beyond the lift structures, • Maximising of opportunities to increase public amenity within the bridge forecourt and between proposed bus shelter/bus stops to enhance the public domain.	Transport for NSW Consultant (design)	Detailed design
LAN3	Accessibility	The design is to continue to provide improvements to cyclist and pedestrian access through new and upgraded, footpaths and shared paths to create a complete network around Medlow Bath Station, connecting into the existing network along the Great Western Highway between Katoomba and Leura.	Transport for NSW Consultant (design)	Detailed design

LAN4	Finishes of Structures	The design of new retaining walls to have finishes of a high standard and quality, that is in keeping with the Great Western Highway character	Transport for NSW Consultant (design)	Detailed design
LAN5	Landscaping	The following principles are to continue to be incorporated into the design of landscaping: • Planting strategies that respond to the existing historical and local context of Medlow Bath, • The planting of feature trees at the entry into Medlow Bath village, and to highlight access into Medlow Bath Station and proposed bus shelters, • The introduction of buffer planting in front of the retaining wall at the southern entry into Medlow Bath to minimise visual impacts, • Maximising of new tree planting where possible; within medians turning facilities, and verges to reduce the scale of the Proposal over time as the tree plantings mature. Consideration has been given to sight lines for motorists when identifying possible locations, • Utilisation of native and endemic plantings along the highway outside of the village to consider pedestrians and cyclists using the existing trails as links to regional routes, • Maximisation of revegetation with appropriate species along the highway to reduce perceived corridor width.	Transport for NSW Consultant (design)	Detailed design
LAN6	Design Integration	The following measures are to be adopted during the Detailed Design stage: • All reasonable measures taken to minimise the loss of existing vegetation along the proposal corridor. Those measures would include minimise clearing of trees for construction access, rationalisation of maintenance access, • Investigate the borrowed landscape and opportunities for additional tree plantings along the proposal corridor, • Investigate opportunities to incorporate heritage qualities within the bridge design, • Further opportunities investigated to increase landscape zones within the road corridor, • Lighting and signage to be well-considered in its placement and should not detrimentally add to the visual impact, • At locations where greater visual impacts have been identified, the specification and planting of more mature sized shrubs and trees would be adopted to help reduce the visual impact upon opening of the road since the proposed planting would take a number of years (approximately between 3 to 10 years) to establish at adequate height, • Where site compounds are needed rehabilitate to previous state.	Transport for NSW Contractor (principal)	Detailed design Construction
SOC1	Property	A Property Acquisition Plan would be prepared and implemented in accordance with the requirements of the *Property Acquisition (Just Terms Compensation) Act 1991.*	Transport for NSW	Pre-construction
SOC2	Community	A Communications Plan would be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The plan would include (as a minimum): • identification of key stakeholders such as the Hydro Majestic Hotel, private residences and business, Blue Mountains City Council • mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • contact name and number for complaints • the plan would be prepared in accordance with the *Community Involvement and Communications Resource Manual* (Roads and Traffic Authority, 2008).	Transport for NSW Consultant (design) Contractor (principal)	Detailed design Pre-construction Construction

		The Plan should be reviewed and updated as necessary throughout construction.		
SOC3	Construction	Access to private residential properties, businesses and the Hydro Majestic Hotel would be maintained throughout the construction period.	Contractor (principal)	Construction
CUM1	Cumulative construction impacts	Other developers would be consulted: • to obtain information about project timeframes and impacts. Identify and implement appropriate safeguards and management measures to minimise cumulative impacts • to manage the interfaces of the Proposal's staging and programming in combination with the other projects occurring in the area.	Transport for NSW Contractor (principal)	Pre-construction Construction
CUM2	Cumulative construction impacts	All environmental management plans (including but not limited to the Traffic Management Plan and Noise and Vibration Management Plan) would be prepared to consider other developments in the area. These plans would be reviewed and updated as necessary throughout the construction phase.	Contractor (principal)	Pre-construction Construction

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Appendix 1 Summary table of respondents, submissions and responses

Unique Author Reference Number	Section number where issues are addressed
1	5.2; 5.3; 5.7
2	5.2; 5.3; 5.7; 5.13
3	5.2; 5.3; 5.7; 5.11
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139	5.3; 5.7
140	5.3; 5.7
141	5.2; 5.3; 5.4; 5.7
142	5.5; 5.7; 5.11
143	5.2
144	5.3; 5.12; 5.13
145	5.2; 5.3; 5.7; 5.13
146	5.2; 5.3; 5.7
147	5.3; 5.5; 5.7
148	5.2; 5.3
149	5.3; 5.5
150	5.2; 5.3; 5.15
151	5.2; 5.3; 5.5; 5.7; 5.8; 5.11
152	5.3

Unique Author Reference Number	Section number where issues are addressed
153	5.2; 5.3; 5.15; 5.20
154	5.3
155	5.1; 5.2; 5.3; 5.6; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18; 5.20; 5.21
156	5.2; 5.3
157	5.2; 5.3; 5.5; 5.7; 5.11; 5.13
158	5.3; 5.7; 5.14
159	5.1; 5.2; 5.3; 5.4; 5.5; 5.6; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18
160	5.2; 5.3
161	2.3; 5.1; 5.2; 5.3; 5.4; 5.5; 5.6; 5.7; 5.8; 5.10; 5.11; 5.12; 5.18; 5.20
162	5.3
163	5.2; 5.3; 5.4; 5.5; 5.7; 5.21
164	5.3; 5.7
165	5.1; 5.3; 5.5; 5.7
166	5.5; 5.13
168	5.3; 5.5
169	5.2; 5.3; 5.5; 5.7; 5.9; 5.10; 5.11; 5.12; 5.13; 5.15
170	2.3; 5.2; 5.3; 5.6; 5.12; 5.18
171	5.2; 5.3; 5.4; 5.5; 5.13; 5.16; 5.17
174	5.2; 5.3
175	2.3; 5.1
176	2.3; 5.4; 5.5; 5.7; 5.8; 5.11; 5.12; 5.15; 5.18
178	5.2; 5.3; 5.5; 5.11
179	2.3
180	5.2; 5.3; 5.4; 5.5; 5.11; 5.13; 5.20
181	5.1; 5.2; 5.3; 5.7
182	5.2; 5.3
183	5.2; 5.3; 5.17
184	5.5; 5.11; 5.13
185	5.1; 5.2; 5.3; 5.10; 5.13
186	5.2; 5.3

Unique Author Reference Number	Section number where issues are addressed
187	5.2; 5.3
188	5.1; 5.2; 5.3; 5.4; 5.12; 5.13; 5.15
189	5.3; 5.4; 5.5; 5.13
190	5.2; 5.3; 5.7
191	5.2; 5.3
192	5.2; 5.3
194	5.2; 5.3; 5.9; 5.11; 5.13
195	5.3; 5.5; 5.6; 5.11
196	5.13
197	5.2; 5.3
198	5.2; 5.3; 5.11; 5.17
199	5.3
200	5.3
201	5.6
203	5.2; 5.3
204	5.1; 5.2; 5.3; 5.4; 5.5; 5.6; 5.7; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18
205	5.2; 5.3; 5.16; 5.17
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207	5.2; 5.3
208	5.2; 5.3
209	5.2; 5.3
210	5.1; 5.2; 5.3; 5.4; 5.5; 5.6; 5.7; 5.10; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18
211	2.3
212	5.2; 5.3
213	5.2; 5.3; 5.13
214	5.1; 5.2; 5.3; 5.5; 5.6; 5.7; 5.10; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18
215	5.2; 5.3
216	5.2; 5.3; 5.7; 5.11; 5.13
217	5.3; 5.13
218	5.2; 5.3; 5.4; 5.5; 5.7; 5.12; 5.13

Unique Author Reference Number	Section number where issues are addressed
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220	5.12; 5.13
221	5.1; 5.2; 5.3; 5.5; 5.6; 5.7; 5.10; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18
222	5.2; 5.3; 5.4; 5.13; 5.21; 5.22
223	2.3
224	5.2; 5.3
225	5.2; 5.3; 5.4; 5.5; 5.11; 5.13; 5.15; 5.18
226	5.2; 5.3
227	5.1; 5.2; 5.3
228	5.2; 5.3; 5.7
229	5.6
230	5.3
231	5.2; 5.3
232	5.1; 5.2; 5.3; 5.5; 5.6; 5.7; 5.8; 5.10; 5.11; 5.12; 5.13; 5.14; 5.15; 5.16; 5.17; 5.18; 5.21; 5.22
233	5.2; 5.3
234	5.2; 5.3; 5.5; 5.11; 5.12; 5.13
235	5.4; 5.5; 5.7; 5.9; 5.11; 5.13
236	5.2; 5.3
237	5.1; 5.2; 5.3
238	5.2; 5.3; 5.4; 5.7; 5.15
239	5.2; 5.3; 5.6; 5.13
240	5.2; 5.3
241	5.3
243	5.2; 5.3; 5.6; 5.13
244	5.1; 5.2; 5.3; 5.5; 5.7; 5.11; 5.17
245	5.2; 5.3
246	5.2; 5.3; 5.4; 5.10; 5.12; 5.13; 5.15; 5.16; 5.17
247	5.2; 5.3; 5.7

Appendix 2 Blue Mountains City Council Submission

APPENDIX 2 Blue Mountains City Council.pdf

Appendix 3 Community Consultation Report (Transport for NSW)

APPENDIX 3_Medlow Bath Consultation Report.pdf

Appendix 4 Landscape Character, Urban Design and Visual Impact Assessment Report

Appendix 4 Urban Design and VIA (SMM).pdf

Appendix 5 Pedestrian Bridge Options Report

APPENDIX 5 Pedestrian Bridge Option Report V2 Publish (003).pdf

Appendix 6 Lighting Considerations and Design

Road Corridor Lighting

Road lighting has been designed in compliance with AS/ZNS 1158: *Lighting for roads and public spaces.*

Given the location of Medlow Bath as a township within the National Park and proximity to residential properties lighting design is critical to good design to reduce light pollution as well as maintaining safety.

Typically highways and main roads need to be V3 standards (as per AS/ZNS 1158). Bearing in mind the sensitivity of Medlow Bath, the V5 standard was used as it limits light spill and provides a balance of safety and security.

The design approach considered:

- Provision of consistent levels of illumination on the carriageway while minimising light spill
- Compatibility with existing lighting at the northern end of the upgrade
- acceptable lighting levels for security around bus stops, car parks and kiss and ride areas
- Compatibility with lighting proposals planned for the pedestrian bridge
- Reuse of existing equipment where possible
- Space constraints within the road cross section

The proposed luminaire would be an 80w RoadLED Midi Aeroscreen mounted at 9m mounting height. The intent in the choice of this luminaire and mounting height is to reduce glare, spill light and preserve as much of the night-time environment as possible while providing amenity and a safe environment.

Further consideration of how to reduce light glare led to investigating the use of a non typical softer colour 3000K (warm white) LED light fitting for Medlow with inbuilt cutout to further prevent glare and waste light and improve performance in fog conditions.

It is expected that there would be a consistent approach to lighting across the whole Great Western Highway Upgrade Program assisting in a positive driving experience through the different towns.

Station and Pedestrian Bridge

Footbridge lighting scheme

The specific bridge location at Medlow Bath and the passenger numbers presents an opportunity for a design that considers sustainability, security and wayfinding. Transport saw an opportunity for the lighting of the bridge to dim while not in use, saving power and reducing local light pollution simultaneously. Transport's design is for the lighting to the centre of the bridge to turn down when inactive and the light at each lift lobby/top of stairs to remain illuminated, acting as beacons in the landscape and improving intuitive wayfinding.

The lighting scheme to the footbridge consists of the following components:

- On the footbridge structure, LED extrusion fitting would be provided along one side of the footbridge structure at high level (above 2.4m AFFL). The extrusion fitting would be provided along the entire length of the footbridge.
- Surface mounted Downlights would be provided off the lift door glass awning structure.
- All lighting to the footbridge would be activated via PIR detectors in operation.
- EXIT signage would be provided to the footbridge and staircases to provide emergency egress out of the station.
- On the stair cases leading up to the footbridge, pole mounted LED flood lights would be provided

Platform lighting scheme

The existing lighting scheme on the station platform is ad hoc combination of solutions that utilises retrofit LED lamps installed consisting of the following:

- Heritage pole mounted luminaires that have been retrofitted with LED bulbs and are located along the platform.
- LED Flood lights mounted on custom constructed steel structure at nominal locations along the platform. The intent of these fittings is to 'supplement' the lighting coverage across the platform.
- Batten luminaires installed to the underside of the existing station awning.

The existing mix of lighting installations do not appear to provide the compliant lighting levels in accordance with AMB standards. To rectify this and to provide a more aesthetic lighting solution in keeping with the heritage nature of the station, the following lighting works are proposed:

- All LED flood lights mounted on custom steel structure would be removed.
- New dome type flood lights would be installed on the heritage light poles. The existing shades would be reused and retrofitted with new LED luminaires. It is intended that the heritage poles would be maintained in the same locations where possible.
- New pole mounted flood lighting (mounted on 6m high poles) would be provided along the platform to supplement the heritage pole lighting and provide compliance. Reduced lighting height (to minimum acceptable) and the use of LED luminaires would aim to reduce light spill and glare on adjacent residents from the station.
- New LED batten lighting would be provided to the underside of the existing awnings.

Lighting within existing station buildings

New luminaires would be provided within the station buildings to replace existing lighting that is non-functional.

Lighting control strategy

A phase dimming lighting control system would be provided to control the lighting on the footbridge during the times when there are no pedestrians are using the structure. Motion detectors provided at the lift entrances would activate the footbridge lighting to ramp up to 100%. Once movement is no longer detected the footbridge lighting would revert to the lower setting. In the event of a failure in the system, the lighting across the footbridge would operate at 100%.

Timeclock and PE cell control would also be provided to the lighting installation via the lighting control system. The above light control strategy would need to be developed in the next stage of design.

Emergency lighting

Emergency lighting and EXIT signage would be provided in accordance with the BCA and AS2293:2018 'Emergency Evacuation Lighting for Buildings' and the AMB emergency infrastructure lighting standard. Emergency lighting would be provided to the underside of the awning areas only. EXIT signage would be provided along the extent of the station and the new footbridge. The emergency lighting would be a computer monitored system.

Kiss and Ride, and car park electrical provisions

The Kiss and Ride and the car park areas would be supplied in the following manner:

- The commuter car park lighting would be designed to Endeavour Energy Standards and would be supplied from the Endeavour energy network.

Appendix 7 Water Quality

The Proposal includes changes in the road geometry and widening which would create an increase in the paved area. This can change existing flood behaviour and alter the flood risk to receivers during operation. Based on hydrological modelling, upstream impacts are generally considered minor given there would be limited vertical changes, and the flows could largely be accommodated by the existing and upgraded drainage structures to be provided. Downstream flooding impacts would be managed through the installation of new detention basins and drainage upgrades. The following provides further detail on the design of the catchment of surface water.

Existing Conditions

To determine the existing conditions at the receiving watercourses, the hydrological model was configured for the existing scenario, including the following key features:

- Catchment delineation through inspection of the LiDAR and detailed survey, inclusive of existing drainage infrastructure
- Formal cross drainage infrastructure comprising culverts beneath the rail embankment
- Overland flow paths
- Informal flood storage which is provided by the sag location adjacent the road reserve prior runoff entering the cross drainage

In all locations the formal drainage infrastructure was found to have capacity of less than the 1% annual exceedance probability (AEP) conditions. The resulting overland flow routes and storage areas where ponding occurs on the surface provide the attenuation of peak catchment runoff rates within the hydrological model to determine the worst case peak flows to the downstream receiving system under existing conditions.

A summary of the existing peak flow rates within the rock lined channel at the proposed site discharge point (Medlow Park) are as summarised in the following table.

Table 1: Existing peak flow rates of drainage channel in Medlow Park

AEP Event	Pre-Developed Peak Discharge (m3/s)
10%	0.975
1%	1.22

Proposed Conditions

A proposed detention basin has been introduced to the hydrological model for the developed scenario to ensure that the post development discharge rates are no greater than the predevelopment discharge rates for all storms up to and including the 1% AEP event, in accordance with Council's requirements. The comparison of flow rates is taken at the discharge location of the proposed detention basin in the existing rock lined channel.

Iterations were performed in the DRAINS model to determine the proposed detention basin volume in order to satisfy Council's pre-post development requirements.

The proposed basin has the following parameters:

- The proposed detention basin is located on the eastern side of the rail alignment. The proposed location of the basin is in the open space in the property to the south of Medlow Bath Park, with the out flows discharging to the rock lined channel in Medlow Bath Park where existing flows are directed;

- The basin has been sized to capture runoff from the proposed road upgrade works and upstream catchments of the road alignment that are captured within the road drainage network;
- Storage has been provided in two separate storage areas with a pipe provided between the two basins to reduce the depth of the basin;
- The storage volume provided is approximately 1,300m^3 (1% AEP TWL in top basin = RL1043.25m AHD and 1% AEP TWL in bottom basin = RL1041.36m AHD) which is contained within the above-ground system with a minimum 150mm freeboard provided from the TWL to the top of the basin embankment (RL1043.54m AHD in top basin and RL1041.6m AHD in bottom basin); and
- Discharge is controlled via a 600mm diameter outlet pipe in order to satisfy pre-post conditions.

Results of the DRAINS analysis are summarised in the following table:

Table 9-1: DRAINS Pre-Post Comparison

AEP Event	Pre-Developed Peak Discharge (m^3/s)	Post-Developed Peak Discharge with OSD (m^3/s)	Top Basin Volume (m^3)	Top Basin TWL depth (m)	Bottom Basin Volume (m^3)	Bottom Basin TWL depth (m)	Total Basin Volume (m^3)
10%	0.975	0.932	235	1.25	420	1	655
1%	1.22	1.15	720	2.2	580	1.3	1,300

Results of the DRAINS analysis indicates that the proposed detention basin provides sufficient flow retardation and attenuation to ensure that the downstream peak post-developed discharges do not exceed those of the pre-developed scenario for the worst-case storm duration.

Onsite Detention

At the discharge location at the low point across the rail alignment the proposed catchment impervious area is increasing, which results in increased runoff. Further to this by providing a new larger crossing of the rail alignment with a greater flow capacity, this also results in increased flows being discharged to the east of the rail alignment. As per the current conditions the existing rail embankment is acting as a blockage of flows together with the existing smaller pipe crossing which restricts flows and provides storage on the western side of the rail alignment. Therefore, onsite detention is required to ensure that the proposed flows are not being increased when compared to the existing flow conditions at the downstream discharge point.

The Onsite Detention (OSD) is to be provided in accordance with Blue Mountains City Council requirements which states that “OSD systems shall be designed and constructed to achieve post development discharge rates that are no greater than the predevelopment discharge rates for all storms up to and including the 100 year event (1% AEP)”.

A combined onsite detention and water quality basin is proposed in the open space in the property to the south of Medlow Bath Park, with outflows to connect to the rock lined channel in Medlow Bath Park where the current existing flows discharge. The basin has three separate areas, a bioretention area and two separate OSD storage areas to reduce the depth of the basin, compared to if a single storage area was utilised. The proposed basin is unfenced to integrate into the surrounding park areas, with the basin a dry basin the majority of the time with water only present during and after rainfall events. One in four batters are provided along the interface with the park area, with sandstone walls incorporating 0.5m steps provided within the basin.

An assessment has been undertaken to ensure that the proposed flows are less than or equal to the existing flows for the design storm events from the 10% AEP to the 1% AEP, in accordance with Blue Mountains City Council requirements. Modelling has been undertaken on the existing case conditions and the proposed case to provide a comparison to ensure the targets are being met.

Water Quality

Water draining from the subject area via the Grose River and Coxs River catchments are subject to controls under the Sydney Drinking Water Catchment. The requirements of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 for proposals within drinking water catchment must have a neutral or beneficial effect (NorBE) on water quality.

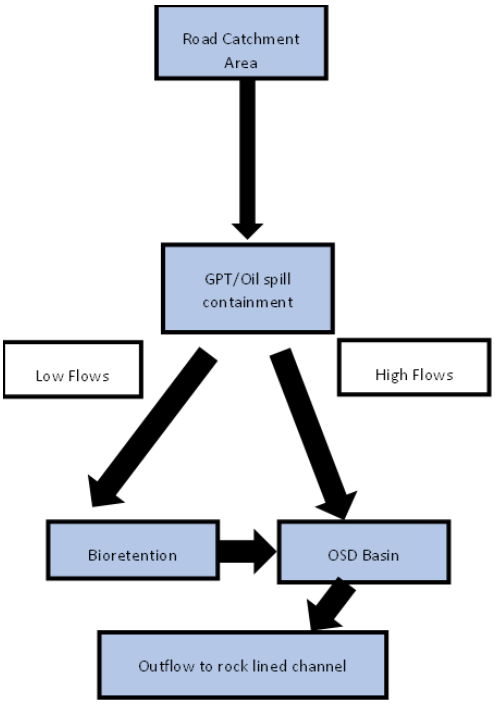
The proposed water quality treatment measures are located on the eastern side of the rail alignment. The proposed treatment utilised to meet the NoRBE targets are as outlined below:

- Gross Pollutant Trap Baramy Single Vane GPT, or approved equivalent. This system is provided to manage gross pollutants as well as including spill management within for oil spills; and
- Bioretention system incorporated within the onsite detention basin.

The proposed location of the basin is in the open space in the property to the south of Medlow Bath Park, without flows to connect to the rock lined channel in Medlow Bath Park where existing flows are directed.

The proposed treatment train is summarised in the figure below.

Medlow Bath Water Quality Management Diagram



It is noted that downstream of the existing rock lined channel secondary treatment is also proposed, which is to be installed by Blue Mountains City Council. This is proposed to be a “value add” system, to provide additional treatment considering the sensitive nature of the downstream receiving waters. However, it should be noted that all requirements and targets are being met with the proposed works as outlined above and does not consider the downstream secondary treatment system.

Analysis of the proposed works was undertaken using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6 software. In undertaking the assessment on the proposed water quality measures, the following guidelines were utilised:

- WaterNSW, ‘Using MUSIC in the Sydney Drinking Water Catchment’ (2018).

- WaterNSW 'Neutral or Beneficial Effect on Water Quality Assessment Guideline' (2021).

A summary of the modelling methodology and results from the MUSIC modelling are outlined in the following sections.

Parameters and Methodology

The following methodology and parameters were incorporated into the MUSIC modelling as outlined below:

- Rainfall data has been adopted as per Zone 7 Lower Cox River, WaterNSW climate zones.
- The soil parameters and associated data have been adopted for Sandy Clay.
- The existing and proposed catchment properties are as summarised below.

Table 9-2: MUSIC Catchment Breakdown

MUSIC Sub-Catchment	Total Area (Ha)	% Impervious (%)
Existing	5.675	75
Proposed	5.675	85

- The proposed and existing catchments were classified as "Sealed Road", with the pollutant concentration parameters used within the model based on the recommended model defaults from the WaterNSW Guidelines as follows:

Table 9-3: MUSIC Node – Rainfall Runoff Parameters

Classification		TSS		TP		TN	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
"Sealed Road"	**Base Flow**	1.20	0.17	-0.85	0.19	0.11	0.12
	Storm Flow	2.43	0.32	-0.30	0.25	0.34	0.19

Source: WaterNSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018)

- The soil properties for the pervious areas of the catchment were defined based on the recommended default parameters listed in WaterNSW's guidelines and are summarised below:

Table 9-4: MUSIC Soil Properties

Soil Properties	Value
Impervious Threshold (mm)	1.5
Soil Storage Capacity (mm)	142
Initial Storage (% of Capacity)	25
Field Capacity (mm)	94
Infiltration Coefficient 'a'	180
Infiltration Coefficient 'b'	3
Initial Groundwater Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Base Flow Rate (%)	25
Daily Deep Seepage Rate (%)	0

Source: WaterNSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018)

Proposed Treatment Measures

To achieve the required pollutant reductions to satisfy the NoRBE requirements, the following water quality treatment train is proposed. A Baramy Single Vane Gross Pollutant Trap (GPT) would be used as the primary treatment which also acts as an oil spill containment measure at the start of the water quality

treatment train followed by a bioretention basin as a secondary treatment. Within the GPT a weir would be provided with minor flows (0.5EY) directed to the bioretention area and high flows bypassing straight to the OSD basin. Runoff from the bioretention would discharge to the OSD portion of the combined basin and ultimately discharge to the existing rock lined channel in Medlow Bath Park. The proposed treatment train measures and MUSIC modelling parameters are summarised in the following sections.

- **Gross Pollutant Trap (GPT)**

  For primary treatment of the stormwater runoff, a Baramy Single Vane GPT is to be provided. The Baramy GPT is a pollution control device specifically designed to remove gross pollutants and coarse sediments from stormwater runoff. Within this structure an inbuilt spill containment chamber is provided. The parameters used for the MUSIC node are as per the input parameters outlined in the WaterNSW to utilise the input data for a GPT as summarised in Table 5 in 'Using MUSIC in the Sydney Drinking Water Catchment' (2018). The proposed input data is as summarised below.

Table 9-5: GPT MUSIC Input Parameters

Pollutant	Input	Output
Suspended Solids (mg/L)	0	0
	75	75
	1000	350
Phosphorus (mg/L)	0	0
	0.5	0.5
	1	0.85
Nitrogen (mg/L)	0	0
	0.5	0.5
	5	4.3
Gross Pollutants (kg/ML)	0	0
	15	1.5

Source: WaterNSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018)

- **Bioretention Basin**

A bioretention system is proposed as an end of line treatment prior to discharge. Bioretention systems typically contain an extended detention zone above a filter layer 300mm in depth and contain water tolerant plant species to facilitate additional nutrient removal. Sediments and attached pollutants (including nutrients, metals, and other soluble pollutants) are removed via filtration through the vegetative surface layer and filter media below. In developing the MUSIC model for the developed site, the following parameters were used in the MUSIC model in accordance with the requirements outlined in 'Using MUSIC in the Sydney Drinking Water Catchment' (WaterNSW, 2019).

Table 9-6: Bioretention Properties

Bioretention Basin Properties	Value
Low Flow Bypass (m3/s)	0
High Flow Bypass (m3/s) – (50% of 1EY flow)	0.36
Extended Detention Depth (m)	0.3
Surface Area (m2)	130
Filter Area (m2)	130
Unlined Filter Media Perimeter (m)	0.01
Saturated Hydraulic Conductivity (mm/hr)	100
Filter Depth (m)	0.6
TN Content of Filter Media (mg/kg)	400
Orthophosphate Content of Filter Media (mg/kg)	40
Exfiltration Rate (mm/hr)	0
Overflow Weir Width (m) – (surface area divided by 10)	13

MUSIC Results

Results of the MUSIC analysis indicate that by including the nominated treatment train as described in this report, the mean annual loads for the total phosphorus, nitrogen, suspended solids, and gross pollutants generated on the developed subject site are less than the pollutants generated in the existing state and achieve the NoRBE requirements. The results from the MUSIC model are displayed in Table below.

Table 9-7: MUSIC Model Results

	Total Suspended Solids (kg/yr)	Total Phosphorous (kg/yr)	Total Nitrogen (kg/yr)	Total Gross Pollutants (kg/yr)
Existing Generation	18,400	30.8	126	1,340
Developed Generation (without treatment)	19,500	32.8	136	1,430
Developed Output	3,020	16.1	88.2	12.7

Climate Change Assessment

In accordance with Transport requirements an assessment of the impacts of climate change is to be undertaken on the proposed design works. An assessment on the performance of the system is to be undertaken on the next design storm event, to assess for any impacts on the performance of the system. If there are adverse impacts to surrounding properties, the higher design storm event would be adopted as needed. The following checks have been undertaken with the following findings:

- Pavement drainage – Climate change check utilising the 5% AEP storm event.
  - Freeboard is still being met at all pits throughout the proposed network in the 5% AEP.
  - There are slight increases to the flow widths within the kerb at some of the locations. The maximum increase is 15mm above the allowable flow width.
- Drainage crossing of the rail alignment – Climate change check utilising the 0.5% AEP storm event.
  - The capacity of the drainage crossing of the rail alignment operates as per the design intent.
  - The TWL in the OSD basin is maintained within the proposed basin. This results in the proposed flows from the site in the 0.5% AEP being less than the existing site flows downstream in the 1% AEP.
  - At the low point there is ponding of approximately 40mm on the western kerb alignment and 110mm on the kerb eastern alignment. This is compared to ponding of approximately 35mm and 105mm respectively in the 1% AEP storm event.

Appendix 8 Cumulative Impact Assessment

This section discusses the potential cumulative impacts that may arise as a result of the construction and operation of the proposal and the combined impacts of this and other projects near the proposal. The cumulative impacts relate to both the individual environmental and social impacts of the proposal as well as the combined effects of this and other proposals in the vicinity of the proposal that form part of the Great Western Highway Upgrade Program.

Study area

The cumulative impact assessment has considered other projects and developments in the Blue Mountains region near the Great Western Highway. It has considered projects which would be under construction at the same time as, or adjacent to, the proposal.

Broader program of work

The proposal is part of the Great Western Highway Upgrade Program. The NSW Government has progressively upgraded sections of the Great Western Highway to make it safer and more reliable for all road users. The broader program would complete the final 34-kilometre connection of a modern dual-carriageway link across the Blue Mountains.

The Great Western Highway Upgrade Program consists of four projects, which are:

- Great Western Highway East – Katoomba to Blackheath Upgrade. This project involves the upgrading and duplication of the existing surface road and will utilise as much as is possible the existing highway corridor. The REF for this project is anticipated for exhibition and consultation in early 2022, following determination of the Medlow Bath REF.
- Great Western Highway Medlow Bath Upgrade (the Proposal). This project involves upgrading and duplicating the existing surface road corridor with intersection improvements and a new pedestrian bridge. The REF for this project was exhibited for consultation between July and September 2021, with construction beginning late 2022.
- Great Western Highway Central – Blackheath to Little Hartley Upgrade. This project involves the construction of a tunnel bypass of Blackheath and Mount Victoria, with connectivity between the two proposed tunnels currently under further investigation. It is anticipated that the Environmental Impact Statement would be exhibited for consultation mid-2022.
- Great Western Highway West – Little Hartley to Lithgow Upgrade. This project involves upgrading, duplicating and widening the existing surface road corridor, with connections to a tunnel portal at Little Hartley. This project REF was exhibited for consultation from November 2021-January 2022.

These four projects would be occurring both concurrently in timeframe and consecutively geographically. They have the potential to result in cumulative impacts to local communities as well as road users throughout the Blue Mountains area. This cumulative impact assessment has considered those projects to the fullest extent possible having regard to the respective status of each project.

Other projects and developments

The other projects and developments which have been identified as relevant when considering the cumulative impacts of the proposal are outlined in table 1 below.

Table 1: Likely impacts of relevant future projects

Project	Construction impacts	Operational impacts
Great Western Highway Medlow Bath Upgrade • Upgrade of the Great Western Highway from two lanes to four lanes in Medlow Bath • Construction expected to commence in 2022, pending planning approval	• temporary delays to motorists and increased construction traffic • change in pedestrian and cyclist access through Medlow Bath • bus service delays • temporary localised air quality, noise and vibration and visual amenity impacts due to construction work • physical impact to non-Aboriginal heritage items.	• improved traffic flows and road safety through Medlow Bath • provision of new public transport and active transport facilities through Medlow Bath • capacity for larger freight vehicles to use the Great Western Highway, reducing the number of heavy vehicles. • visual impacts to the mountain village from the duplication of the highway and the new pedestrian bridge.
GWH East Upgrade (Katoomba to Medlow Bath and Medlow Bath to Blackheath) • The project will be adjacent to the Medlow Bath proposal area on both the northern and southern ends. • The project involves upgrading, duplicating and widening of the existing surface road corridor, with connections to a tunnel portal at Blackheath.	• Transport and traffic, including road safety impacts • Air quality, including in-tunnel and ambient air quality impacts • Noise and vibration impacts • Socio-economic, land use and property impacts • Urban design, landscape character and visual amenity • Biodiversity impacts • Geology, groundwater and ground movement impacts	• Improvements to existing performance of the highway including accommodating future increases in traffic volumes • Improved traffic flows • Improved safety for vehicles
GWH Central Upgrade (Blackheath to Little Hartley) • The project will be approximately ~2.5 km away. • The project involves the construction of a tunnel bypass of Blackheath and Mount Victoria, with connectivity between the two proposed tunnels currently under further investigation.	• Transport and traffic, including road safety impacts • Air quality, including in-tunnel and ambient air quality impacts • Noise and vibration impacts • Socio-economic, land use and property impacts (including impacts on the Blue Mountains National Park)	• Improvements to existing performance of the highway including accommodating future increases in traffic volumes • Improved traffic flows • Improved safety for vehicles

Project	Construction impacts	Operational impacts
	• Urban design, landscape character and visual amenity • Biodiversity impacts • Geology, groundwater and ground movement impacts	
GWH West Upgrade (Little Hartley to Lithgow) • The project will be approximately ~13 km away. • The project involves upgrading, duplicating and widening of the existing road corridor	• Transport and traffic, including road safety impacts • Air quality, including in-tunnel and ambient air quality impacts • Noise and vibration impacts • Socio-economic, land use and property impacts (including impacts on the Blue Mountains National Park) • Urban design, landscape character and visual amenity • Biodiversity impacts Geology, groundwater and ground movement impacts	• Improvements to existing performance of the highway including accommodating future increases in traffic volumes • Improved traffic flows • Improved safety for vehicles

Cumulative impact assessment

A review of the likely cumulative impacts associated with the four projects is provided in table 2 below.

Table 2: Potential cumulative impacts associated with the proposal and other future Great Western Highway upgrade projects

Environmental Factor	Potential Cumulative Impacts
Biodiversity	The removal of about 75.53 hectares of native vegetation (of which the proposal accounts for 0.34 hectares) comprising a number of plant community types: • Sydney Peppermint – Silvertop Ash (0.34 hectares removed)

Environmental Factor	Potential Cumulative Impacts
	• Ribbon Gum – Yellow Box grassy woodland on undulating terrain of the eastern tablelands, South Eastern Highland (0.05 hectares removed) • Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions (0.86 hectares removed) • Silvertop Ash – Narrow-leaved Peppermint open forest on ridges of the eastern tableland, South (0.89 hectares removed) Eastern Highlands and South East Corner • Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregion (17.59 hectares removed) listed as Endangered under the BC Act • White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (5.82 hectares removed) listed as critically endangered under the BC Act and the EPBC Act. Residential and infrastructure development near the Great Western Highway (particularly between Mt Victoria and Lithgow) in historic and recent times has led to extensive vegetation clearing near the identified projects. In some areas, remaining remnant vegetation and habitat has also been affected by a variety of disturbance mechanisms, including clearing of undergrowth, altered fire regimes, feral animals and weed invasion. In other areas, large extents of vegetation remain close to the highway, include remnant bushland that wraps around town development and areas that have regenerated such as around Pulpit Hill. The Great Western Highway Upgrade Program would result in further vegetation removal. This would result in long-term effects such as habitat fragmentation and some loss of wildlife connectivity corridors in the area. Invasion and further spread of weeds, pests and pathogens, and changes to surface hydrology may occur due to these projects and the associated vegetation removal. The direct biodiversity impacts of the identified projects to native vegetation, where publicly available, would be: • Great Western Highway Medlow Bath Upgrade – 0.36 hectares of vegetation, including 0.34 hectares of vegetation identified as Sydney Peppermint – Silvertop Ash • Great Western Highway West – Little Hartley to Lithgow – 17.59 hectares is consistent with Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregion, listed as Endangered under the BC Act and – – 5.82 hectares is consistent with White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South

Environmental Factor	Potential Cumulative Impacts
	Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions, listed as Critically Endangered under the BC Act – – 3.6 hectares is consistent with White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland, listed as Critically Endangered under the EPBC Act Most of the vegetation likely to be affected by the proposal is located adjacent to the Great Western Highway and has been subject to historic clearing and edge effects. It is thinned in areas and some areas are dominated by a range of introduced species. This increase is considered unlikely to significantly exacerbate impacts on biodiversity such that the critical threshold would be reached. The Great Western Highway Medlow Bath Upgrade is not likely to have a significant impact on threatened species, ecological communities and their habitats. Residual impacts are to be minimised and mitigated. As such, a Biodiversity Offset Strategy is not required for this project. However, the proposal would develop a biodiversity offset strategy to protect further sections of vegetation. Other projects within the Great Western Highway Upgrade Program would also develop biodiversity offset strategies if required by Transport's guidelines or the Biodversity Assessment Method. Indirect impacts on biodiversity from noise, dust, light and contaminant pollution are likely to result from the projects and would likely result in incremental cumulative effects. The environmental safeguards and mitigation measures implemented as part of each project would minimise potential impacts such as appropriate controls to manage dust emission, runoff, spills and leaks during construction. Operational biodiversity impact associated with nearby projects were assessed as being minor and therefore cumulative impacts would be minimal.
Heritage	The Great Western Highway Upgrade Program would result in impacts to both Aboriginal and non-Aboriginal heritage items between Katoomba and Lithgow. The entire Blue Mountains region has a high level of Aboriginal and non-Aboriginal cultural significance. This includes a high number of heritage items connected with European exploration of the region near the road corridor as well as Aboriginal objects, sites, and places registered on Aboriginal Heritage Information Management System (AHIMS). Transport is currently engaging with specialist heritage consultants and stakeholders to develop a heritage interpretation strategy across the Great Western Highway Upgrade Program – Katoomba to Lithgow. This heritage interpretation strategy would look to interpret both Aboriginal and non-Aboriginal heritage along the highway alignment.

Environmental Factor	Potential Cumulative Impacts
	Non-Aboriginal heritage The Great Western Highway Medlow Bath Upgrade would impact non-Aboriginal heritage items including those near Medlow Bath Railway Station, Avenue of Trees and Bellevue Crescent. The project has also avoided impact to heritage items through the village of Medlow Bath. However, each project has avoided impacts to these items where possible. Impacts to non-Aboriginal heritage across both projects are not considered to be significant. Aboriginal cultural heritage An Aboriginal Cultural Heritage Assessment Report (Transport, 2021) has been carried out for the Great Western Highway Upgrade Program. The project area for the entire Great Western Highway Upgrade program (inclusive of adjacent sites) contains a total of 25 Aboriginal sites. These have been identified near the Great Western Highway Central – Blackheath to Little Hartley Upgrade and Great Western Highway West – Little Hartley to Lithgow Upgrade. No AHIMS records have been identified near Great Western Highway Medlow Bath Upgrade. The overall significance of these Aboriginal sites falls within a range of low to high. The sites are of increased significance due to their rarity in an increasingly developed environment. Therefore, if serious harm such as complete loss of a site was to occur, the regional Aboriginal cultural heritage values would be reduced significantly by the cumulative impacts from the Great Western Highway Upgrade Program. Any mitigation of impact to these sites during construction of each project would minimise the broader cumulative Aboriginal cultural heritage impacts of the Great Western Highway Upgrade Program.
Landscape Character and Visuals	Construction work for the Great Western Highway Upgrade Program would be linear, and as such, static receivers such as townships or receivers would experience limited cumulative landscape character and visual impacts. Medlow Bath residents who travel regularly to Katoomba or Blackheath, would be exposed to the visual impacts of the proposal, and the Great Western Highway East – Katoomba to Blackheath Upgrade. Both of these future projects would be visible in the township. However, the largest cumulative visual impacts from the upgrade program would be motorists and active transport users travelling along the Great Western Highway beyond one project area. There would be a change in landscape character between Katoomba and Lithgow due to the entire Great Western Highway Upgrade Program. The removal of vegetation and widening of the Great Western Highway road corridor would lead to cumulative operational visual impacts. However, the Great Western Highway Upgrade Program has applied a consistent urban design framework across all projects. The design of the Great Western Highway Medlow Bath Upgrade is an integrated design

Environmental Factor	Potential Cumulative Impacts
	that fits with the existing visual qualities, ecology and character of Medlow Bath and the Blue Mountains. This proposal has also considered the urban design and visual impacts on the township of Medlow Bath. The application of the consistent urban design strategy would minimise the potential for inconsistent landscape character impacts along the upgraded road corridor between Katoomba and Lithgow.
Surface water and groundwater	Cumulative groundwater impacts associated with the construction of the proposal interacting with other major projects in the area are assessed as unlikely to occur. This is because no material impacts to groundwater due to the proposal are likely provided appropriate management measures are implemented. Potential impacts to surface water for these projects would be relatively confined to particular catchments, but if not managed appropriately would affect water quality and sensitive receiving environments more broadly in the Blue Mountains area. Of particular concern would be any downstream impacts to the Blue Mountains National Park and the Special Catchment Areas. The Great Western Highway Medlow Bath Upgrade would result in a beneficial effect on surface water quality through an operational water quality treatment process involving the installation of an onsite stormwater detention basin. This process is designed to remove gross pollutants and reduce residual pollutants from surface water runoff from the Great Western Highway. While there would be flooding impacts associated with the Great Western Highway Medlow Bath Upgrade, impacts would be localised and unlikely to have major cumulative impacts across projects. Cumulative impacts would be limited to localised flooding near drainage outlets near the tie-in between this proposal and the Medlow Bath East Upgrade. As such, construction of the projects could lead to increased flood risk along the Great Western Highway near existing drainage infrastructure and waterways. Blockage or diversion of local drainage lines during construction could result in localised flooding upstream of work. This could carry additional contaminants into receiving watercourses, resulting in minor and localised impacts. Across all projects, Transport would appropriately manage runoff from construction in accordance with industry best practice. The Great Western Highway Upgrade Program would result in a cumulative increase to existing impervious areas and horizontal/vertical alignments along the upgraded road corridor. At present, there is minimal piped infrastructure. This would increase the volume and flow of surface water into receiving catchments and reduce the rate of recharge of groundwater. Changes in stormwater and groundwater interactions may also cause an increase in groundwater and soil salinity. However, the proposed design for the Great Western Highway Medlow Bath Upgrade and the Great Western Highway Upgrade Program includes provision for capture of surface runoff with a large pit and pipe network and lead to a minimal

Environmental Factor	Potential Cumulative Impacts
	impact on the receiving surface water sources. This would result in an improvement along the entire Great Western Highway road corridor between Katoomba and Lithgow compared to the existing scenario. Transport would continue to work with Blue Mountains City Council and Water NSW to develop a water quality strategy across the upgrade program to improve water runoff from the highway. Cumulative groundwater impacts associated with the operation of the proposal interacting with other major projects in the area are assessed as unlikely to occur. This is because no material impacts to groundwater due to the proposal are likely provided appropriate management measures are implemented. In a flooding context (stormwater generated outside the proposal) the cumulative impacts of the proposal are negligible. Floodwater would be conveyed across the proposed alignment without significant change in all but the most extreme floods. The proposal would not result in any cumulative operational flooding impacts.
Soils and contamination	Cumulative construction soil and surface water quality impacts would be minimal. Key risks would include increased risk of erosion and sedimentation, transport of materials to and from site and accidental spillages however these could be managed with the implementation of mitigation measures. Cumulative operation soils and surface water quality impacts would relate to risk of runoff, accidental leaks or spills and erosion from areas that have not been stabilised adequately. These risks would be managed through the implementation of suitable mitigation measures.
Socio-economic	Some residents of the Blue Mountains community may be impacted by consultation for and construction of multiple upgrades within the Great Western Highway Upgrade Program. This may lead to consultation and construction fatigue for local communities and stakeholders, with construction of these projects spanning from 2022 to 2026. Cumulative impacts from construction would be in the form of reduced amenity during the construction of the Great Western Highway Medlow Bath Upgrade adjacent works. There would be air quality, noise and visual impacts which could impact on the health and wellbeing of sensitive receivers who live near the Great Western Highway and active transport users travelling between Katoomba and Blackheath. While the Great Western Highway Medlow Bath Upgrade would be completed prior to the main construction work adjacent packages, there would be extended impacts along the road corridor beyond the length of one of the projects. However, due to the linear nature of the projects, impacts at any one location would be localised for only part of each project's construction period. Transport would manage the staging of construction of the Great Western Highway Upgrade Program to minimise these impacts on receivers.

Environmental Factor	Potential Cumulative Impacts
	The projects would improve connection to social infrastructure and provide new active transport opportunities along the Great Western Highway. The Great Western Highway Medlow Bath Upgrade would provide better east/west connectivity for residents, visitors and recreation users on the proposed shared user path. This would enhance the tourism reputation of the town of Medlow Bath and broader Blue Mountains area. It would also provide wellbeing benefits to residents and visitors, who would be more easily able to access recreational sites in the region.
Property and Land Use	The Great Western Highway Medlow Bath Upgrade would result in the full acquisition of eight properties and partial acquisition of one property. Impacts to affected property owners would be localised. This would minimise the potential for any cumulative impacts due to property acquisition. However, the Great Western Highway Upgrade Program would impact part of the Blue Mountains National Park and Transport is seeking to revoke the land required for the program. There could be cumulative impacts to the natural and cultural resources which exist within the national park by reducing its extent. However, the area proposed for revocation is a small part of the entire Blue Mountains National Park and is adjacent to the existing highway, with numerous access trails. Part of the revocation process is providing compensatory lands to the national park being revoked. Transport is investigating opportunities for additional land near the Great Western Highway to be gazetted as national park. This would result in more land in the Blue Mountains region being protected as national park and enhance protection of the natural and cultural resources of the regional landscape. These discussions are ongoing between Transport and NPWS.
Noise and Impact Fatigue	Potential for concurrent cumulative construction noise impacts associated with the proposal and the Great Western Highway East Upgrade proposal. Since the construction scenarios required for both proposals would likely require similar items of equipment, concurrent construction work being completed near to a particular area could theoretically increase worst-case noise levels. The various stages of the upgrade of the Great Western Highway would result in overlapping proposals in the wider area. When the impacts from various stages of the program are combined with the impacts generated by the previous projects, they may result in consecutive impacts (i.e ‘construction fatigue’) at surrounding receivers due to construction works occurring over an extended period. Residential receivers in proximity to the proposal could also experience consecutive cumulative noise and vibration impacts associated with several recent safety upgrades to the Great Western Highway in the project area. This could contribute to construction fatigue. Construction noise impacts from both the Great Western Highway Medlow Bath Upgrade would be expected to impact some sensitive receivers during construction. The construction of the Great Western Highway Medlow Bath Upgrade has been staged to be complete before main construction work commences for adjacent sections. This is to deliver access improvements

Environmental Factor	Potential Cumulative Impacts
	in Medlow Bath and limit the amenity impacts of multiple construction projects running in and around Medlow Bath at the same time. Construction staging would mean that construction work from both projects would not be occurring simultaneously. This would mean that there is no cumulative increase in construction noise levels for sensitive receivers near Coachhouse Lane, Foy Avenue and Delmonte Avenue, Medlow Bath, near the tie-in of the proposal with the Great Western Highway Medlow Bath Upgrade. However, there may be some sensitive receivers in these areas who may also experience noise impacts over a longer duration due to the projects. However, the impacts would not be for the full construction period. Transport would work with eligible receivers to provide appropriate mitigation, including respite periods where feasible. Due to the linear nature of the Great Western Highway upgrades, cumulative operational traffic Nosie impacts would not be expected at any one receiver.
Traffic	Interaction between construction and highway traffic would occur along the proposal area. The most significant impact would be during the AM peak and PM peak periods when the use of the highway is at its highest. However, during off peak periods, construction traffic is not anticipated to adversely impact operational efficiency on the highway. Vehicles travelling along the Great Western Highway between Katoomba and Lithgow would experience concurrent cumulative traffic impacts due to congestion resulting in delays associated with the broader Great Western Highway Upgrade Program. Road users would also experience consecutive cumulative traffic impacts associated with several recent safety upgrades to the Great Western Highway in the project area. This could contribute to construction fatigue. The proposal is scheduled to be constructed in advance of adjacent packages. Staging the construction works would avoid concurrent construction work between separate projects near Medlow Bath. This would avoid concurrent traffic impacts through Medlow Bath and sections of highway that connect Medlow Bath to the local centres of Katoomba and Blackheath. However, it is noted that construction between Katoomba and Blackheath would occur over a longer period time as the construction periods between the projects would not overlap. As the proposal has been developed to enable the highway to continue operation during the construction, it is not anticipated that there would be long term ongoing traffic impacts. However, more broadly, across the Great Western Highway between Katoomba and Lithgow and the Blue Mountains community, some traffic impacts may occur with construction of these projects spanning from 2022 to 2026. Motorists travelling between Katoomba and Lithgow would be most affected by these ongoing disruptions. Access to ancillary facilities and work sites would be in discrete locations that may cause traffic delays through the proposal area and cause frustration for motorists, pedestrians or cyclists. These delays would be most noticeable on weekends and during peak holiday periods, when the Great

Environmental Factor	Potential Cumulative Impacts
	Western Highway is known to experience higher traffic volumes. However, more local movements would not be affected by the broader program of work. The Great Western Highway Central – Blackheath to Little Hartley Upgrade would still be under construction once the other projects within the Great Western Highway Upgrade Program are operational. This may see additional construction vehicles and heavy machinery travelling along the highway until construction of this project is completed. Once all projects within the Great Western Highway Upgrade Program are operational, there would be positive cumulative impacts associated with improved travel time, safety and resilience and reduced congestion along the road corridor between Katoomba and Lithgow. The Great Western Highway Upgrade Program would deliver more efficient and reliable journeys for those travelling in, around and through the Blue Mountains, and better connect communities in the Central West. Once the Great Western Highway Central – Blackheath to Little Hartley Upgrade is operational, there would be an increase in traffic volumes between Katoomba and Blackheath from 2028. This is due to the expected release of light vehicle latent demand which is expected to shift from minor roads to the upgraded Great Western Highway. However, there would be a positive cumulative impact of the proposal and the Great Western Highway Central – Blackheath to Little Hartley Upgrade. In 2036, the operation would improve the road existing conditions while accommodating for the expected increased traffic volumes. Transport would also seek to maintain and enhance active transport opportunities along the length of the Great Western Highway Upgrade Program, with these benefits to be realised once construction of the program is complete. Traffic modelling of future year periods indicate that the proposed upgrade would provide a safer, reliable and more efficient road corridor on the Great Western Highway between Little Hartley and Lithgow.
Air Quality and greenhouse gas emissions	Although there several projects within the vicinity of the proposal, none are expected to result in any cumulative air quality impacts with the proposal. The only potential for cumulative impacts which may arise is if construction of adjacent segments of the proposal are completed at the same time such that receiver(s) may be affected by emissions from multiple work areas. These impacts would be minimised through construction planning. The proposal would not result in cumulative operational air quality impacts.

Safeguards and management measures

Safeguards and management measures to specifically address the cumulative impacts are outlined in table 3 below

Table 3: Safeguards and management measures – cumulative impacts

Impact	Environmental safeguards	Responsibility	Timing	Reference
Cumulative impacts	Ongoing consultation will be carried out between proponents and construction contractors of nearby projects to identify the potential for cumulative impacts to occur should construction occur concurrently with the proposal.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional safeguard
Cumulative impacts	Co-ordination of traffic management controls will be considered to minimise cumulative traffic impacts, particularly during peak holiday periods.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional safeguard
Cumulative impacts	Co-ordination of out of hours work will be considered across the Great Western Highway East and the Medlow Bath upgrade in Medlow Bath to minimise out of hours work periods and minimise ongoing out of hours work noise to sensitive receivers and ensure respite periods are achieved where required.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional safeguard